SUSTAINING THE LIGHT-HEAVY BRIGADE

A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements for the degree

MASTER OF MILITARY ART AND SCIENCE

by

CHRISTOPHER TUCKER, MAJ, USA
B.S., The Citadel, 1979

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Current and evolving doctrine are analyzed to determine the methods for sustaining the light-heavy brigade. The study determined a need to plan in detail the task organization of a light-heavy brigade and that sustainment of the force required extensive planning and preparation. The study concludes that the light-heavy brigade is a viable, supportable force; however, the heavy task force requires extensive external support to fight effectively with a light infantry brigade.

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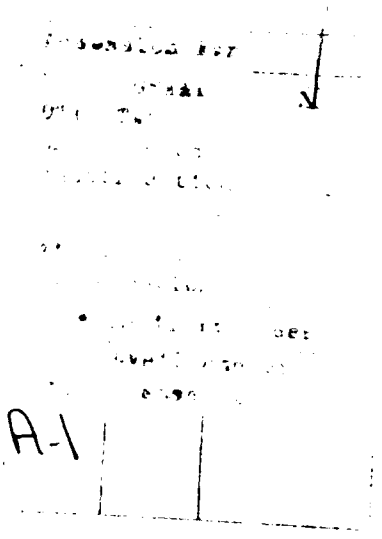

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ABSTRACT

SUSTAINING THE LIGHT-HEAVY BRIGADE by MAJ Christopher Tucker, USA, 152 pages.

This study examines the sustainment challenges encountered when a mechanized infantry task force augments a light infantry brigade. The study determines the validity of establishing a light-heavy mix within the light brigade and explores the support required to sustain this force.

The study determined that history and recent experiences at the combat training centers provide valuable lessons for the employment and sustainment of light-heavy forces. The lessons are then applied to the light-heavy force given current doctrine to identify shortcomings and possible solutions.

Current and evolving doctrine are analyzed to determine the methods for sustaining the light-heavy brigade. The study determined a need to plan in detail the task organization of a light-heavy brigade and that sustainment of the force required extensive planning and preparation. The study concludes that the light-heavy brigade is a viable, supportable force; however, the heavy task force requires extensive external support to fight effectively with a light infantry brigade.

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LIST OF ACRONYMS

AA ..... Antiaircraft
AGF ..... Army Ground Forces
AOE ..... Army of Excellence
ASL ..... Authorized Stockage List
AXP ..... Ambulance Exchange Point

BAS ..... Battalion Aid Station
BOS ..... Battlefield Operating Systems
BSA ..... Brigade Support Area

CGSC ..... US Army Command and General Staff College
CMTC ..... Combat Maneuver Training Center
COS ..... Classes of Supply
  Class I ..... Food
  Class II ..... General Supplies
  Class III ..... Fuel/Petroleum Oil and Lubricants
  Class IV ..... Barrier Material
  Class V ..... Ammunition
  Class VI ..... Health and Comfort Items
  Class VII ..... Major Items of Equipment
  Class VIII ..... Medical Supplies
  Class IX ..... Repair Parts
  Class X ..... Nonmilitary Materials
CONUS ..... Continental United States
COSCOM ..... Corps Support Command
CSS ..... Combat Service Support
CTC ..... Combat Training Center

DISCOM ..... Division Support Command
DIVARTY ..... Division Artillery
DMMC ..... Division Materiel Management Center
DS ..... Direct Support

FC ..... Field Circular
FM ..... Field Manual
FSB ..... Forward Support Battalion

GS ..... General Support

HEMTT ..... Heavy Expanded Mobility Tactical Truck
HMMWV ..... High Maneuver Mobility Wheeled Vehicle

JRTC ..... Joint Readiness Training Center
JTF ..... Joint Task Force

LID ..... Light Infantry Division

MCP ..... Maintenance Collection Point
MMAS ..... Master of Military Art and Science

MSB .....Main Support Battal on
MST .....Maintenance Support Team

NTC .....National Training Center

OH .....Operational Handbook
OPCON .....Operational Control

SAMS .....School for Advanced Military Studies
ST .....Student Text
ST .....Short Ton (2000 lbs)

TOE .....Table of Organization and Equipment

USARSO .....United States Army South
USSOUTHCOM .....United States Southern Command

CHAPTER 1

INTRODUCTION

> Operations involving heavy and light forces working in concert appear to be the direction in which the Army is moving as we approach the 21st century. The need for our forces to fulfill the fundamental qualities of versatility, depolyability, and lethality, clearly indicates that a mix of heavy and light forces provides optimum capabilities for winning across the spectrum of conflict. There remain, however, many acute and complex problems related to the employment of such forces. Questions abound regarding sustainability and support of mixed disparate forces.[1]

During this decade the United States Army will reduce its active strength to twelve divisions.[2] Light infantry divisions will likely account for one-third to one-half of the Army's division structure. Given this force mix the Army must be ready to task organize forces from different divisions to accomplish its missions. This requires a logistical system that is flexible enough to support pure, heavy-light, and light-heavy forces. The objective of this paper is to analyze logistical operations required to sustain a light-heavy mix. Specifically, a light infantry brigade augmented by a heavy task force.

BACKGROUND

Warfare changed significantly during this century. Operations undertaken in major wars such as World War II and limited conflicts such as Operation Just Cause demonstrate the Army's need for a flexible force structure. In the last two years the world has witnessed a change in its social, political, and military appearance. The Warsaw Pact dissolved, while third world countries and those in Southwest Asia became stronger. The US Army no longer faces a single, major threat, but a series of countries with well-developed military forces. In the 1990's the focus will shift from a forward deployed army to a CONUS based contingency army that must be able to project its power worldwide. The result is an increased reliance on forces that can be tailored to accomplish specific objectives.

Light Forces

The Army currently maintains six different types of divisions in the force structure. Each type has specific capabilities which support the Army's wartime requirements. The newest division is the light infantry division (LID). The division, designed for strategic mobility, is lacking in antiarmor firepower and armored protection.

The light infantry division was established in 1984 to provide the Army with a large rapidly deployable force. The division is designed to fight in the entire spectrum of

conflict, low-, mid-, or high-intensity. The mission statement of the light infantry division is:

> Rapidly deploys to defeat enemy forces in low intensity conflict and when properly augmented, reinforces U.S. forces committed to a mid- to high intensity conflict.[4]

Given this mission statement, the light infantry division design provides the capability to meet the Army's requirements. (See Figure 1.)

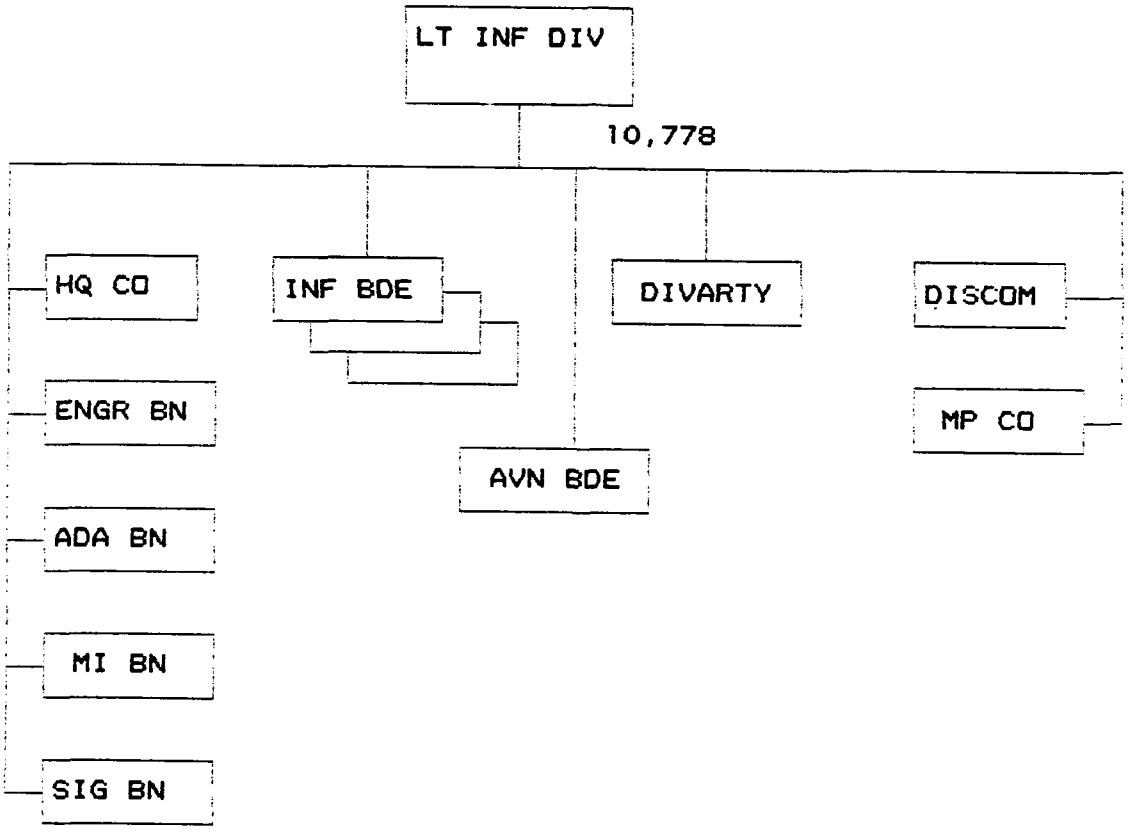

Figure 1. Light Infantry Division.

SOURCE: Table of Organization and Equipment 77L, Washington, DC: Department of the Army, 1988.

The principal combat forces within the division consist of three infantry brigades each organized with three infantry battalions. The brigade has significant infantry strength while maintaining a high combat to combat service support ratio. Figure 2 illustrates the basic organization of the brigade.

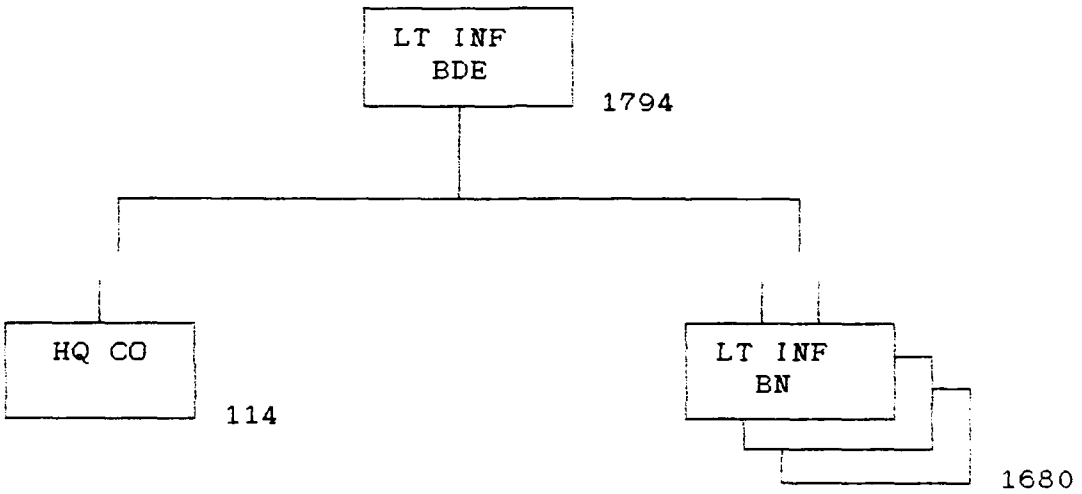

Figure 2. Light Infantry Brigade.

SOURCE: Table of Organization and Equipment 77L, Washington, DC: Department of the Army, 1988.

Based on its organization and mission requirements the brigade possesses a number of capabilities which include :

- Attack to defeat light enemy forces or seize terrain. If properly task organized and augmented it can attack to defeat heavy enemy forces on close terrain.
- Conduct combat operations in contingency areas under all climatic conditions.
- Operate for 48 hours without external support.
- Conduct MOUT operations.
- Quickly integrate augmentation forces whether they are combat, combat support (CS), or combat service support (CSS).
- Conduct air assault operations.
- Reinforce or be reinforced by airborne, air assault, special, armor, or mechanized forces.[5]

Likewise the light infantry brigade has a number of limitations which include :

- Tactical mobility is constrained by limited organic vehicles.
- External CSS support is required after 48 hours.
- Cannot conduct a forced entry operation.
- Division has limited chemical, smoke and decontamination capability.
- Division has limited organic CSS structure.
- Division operates without redundant systems.[6]

One of the key limitations of light forces is their small CSS structure. The CSS elements of the light infantry are austere by design. This is due to its strategic deployability role. The light CSS system is organic

primarily at the division level, with forward support battalions from the division support command (DISCOM) employed to support the infantry brigades. The system emphasizes maintenance of inoperable systems at higher echelons or their replacement rather than forward repair.

Consumption of supplies by light infantry units is not usually high or in the case of ammuntion does not involve high tonnage items. Class III and V are generally prepared in preconfigured loads to allow for rapid resupply and to reduce transportation requirements.

Heavy Forces

The US Army's heavy forces are in the mechanized and armored divisions and separate brigades. The thesis will focus on a task organized mechanized infantry battalion. The task force will consist of two mechanized infantry companies, two tank companies, an antitank company an engineer company and an air defense artillery platoon.

The task force has specific missions, capabilities, and limitations that define its role on the battlefield. The mission of the task force is to:

> Close with and destroy enemy forces using fire, maneuver, and shock effect or to repel his assault by fire and counterattack.[7]

The task force normally fights as part of a brigade. It is the brigade commander who makes the decision to form

the task force to take advantage of the mechanized infantry and armor capabilities. The specific capabilities of the task force include:

- conduct sustained combat operations in all environments.
- accomplish rapid movement and maneuver.
- exploit success and pursue a defeated enemy as part of a larger force.
- conduct security operations for a larger force.[8]

The task force, like any unit, has certain limitations. These include:

- mobility and firepower are restricted by urban areas, dense, and rugged terrain.
- strategic mobility is limited by the quantity of heavy equipment.
- consumption of supply items is high especially class III, V, and IX.[9]

In contrast to light forces, two of the key liabilities of the heavy force are the high supply consumption rates and vehicle maintenance requirements. This requires an extensive CSS structure that is capable of meeting the requirements generated by the force. As a result, heavy forces have a large CSS structure which is organic at the battalion and division level.

In heavy units combat service support is conducted as far forward as possible. "Weapons systems are armed, fueled, fixed, and manned in forward positions. . . ."[10] Modern systems such as the M-1 tank and M-2 infantry fighting

vehicle (IFV) consume significant quanities of fuel and ammunition. This is in sharp contrast to the requirements generated by light forces.

Light-Heavy Forces

> While the task force is optimally employed under a parent brigade in terrain suitable for maneuver. Mechanized units are restricted when they encounter urban or rugged terrain. In this area it is tactically advantageous to use light units and the task force may find itself cross attached to a light brigade and therefore part of a light-heavy mix.''

The combination of light and heavy forces is not new. The June 1944 edition of Field Manual (FM) 100-5, Operations stated," an infantry force fighting a combined arms enemy must be supported by tanks, and conversely, the primary role of armored infantry was to support tanks."''

The lessons of combined arms warfare continued throughout following conflicts. In Korea the only forces consistently able to slow or stop North Korean attacks were forces that combined infantry and armor.'' In Panama, in December 1989, Operation JUST CAUSE began with the employment of pure infantry and airborne forces; but once on the ground, some light infantry units were augmented with mechanized infantry.

Since the creation of the light division in 1984 the task organization of light and heavy forces has generally been accomplished by augmenting heavy units with light infantry brigades or battalions. Only on a few occaisions has a heavy force augmented a light infantry headquarters.

One of the key reasons this task organization is infrequently employed is the support structure of the light infantry. As we discussed earlier the support structure in the light infantry division (LID) is small by design and not prepared to support a heavy unit.

PURPOSE

The primary purpose of my thesis is to analyze the task organization of light and heavy forces and identify what logistical support structure is needed to sustain these forces. I will concentrate on the light infantry brigade and analyze this force when augmented by a heavy task force.

RESEARCH OBJECTIVES

Although the primary objective is to identify what logistical support is required to sustain the light-heavy brigade, a number of related issues must be addressed:

(1) Why would the Army employ a light-heavy force?

(2) What are the sustainment requirements of a heavy task force while augmenting a light infantry brigade? Specifically, what are the ammunition, fuel, maintenance, and transportation requirements of the heavy task force while supporting the brigade?

(3) What CSS units must be available to support a heavy task force while augmenting a light infantry brigade?

(4) How should CSS assets be organized to best support the force? Discussion of these questions and

related issues will attempt to provide input to emerging doctrine for the employment of these forces.

ASSUMPTIONS

To reduce the scope of this study, the following assumptions are made:

(1) The Army will continue to plan for the employment of light-heavy forces in the future.

(2) Light and heavy forces will be task organized at the brigade level.

(3) The Corps and the Corps Support Command (COSCOM) will continue to provide support to divisions.

(4) Light infantry divisions as organized under the " L " series Table of Organization and Equipment (TOE) have utility on the high-intensity battlefield.

(5) Light and heavy units will be employed in accordance with evolving doctrine and within mission capabilities.

(6) The reorganization of the LID DISCOM with multifunctional battalions will continue.

DEFINITION OF TERMS

(1) Heavy forces. Identifies those forces organized as mechanized infantry, armor, or a combination of both. By doctrine these forces have organic sustainment units at company, battalion, and division.

(2) Light forces. Identifies those forces organized under the light infantry division (LID) concept. The term

will also be used to refer to airborne and air assault infantry units. Sustainment units in the light division are not organic below the division level.

(3) Light-Heavy Force. A unit that is task organized with light and heavy forces. The parent unit headquarters must have an organic light infantry base. For this thesis, a light-heavy brigade will have a light infantry headquarters, two light infantry battalions, and a mechanized infantry task force.

(4) Task Force. A temporary grouping of units under one commander formed to carry out a specific operation or mission.[14]

(5) Logistics. The planning and carrying out of the movement and maintenance of forces.[15]

(6) Doctrine. Doctrine involves the basic principles by which military forces guide their actions in support of national goals. Doctrine is set by a high command level but it requires judgement in its use.

(7) Augmentation. Augmentation is a command relationship. Units that are designated to augment another force are therefore not available to the losing command for the period of augmentation.

(8) Attachment. The temporary placement of units in an organization under the control of another organization. The gaining organization is responsible for overall command and control and logistical support during the period of attachment.[16]

(9) Operational Control (OPCON). The temporary placement of units in an organization under the control of another organization. The gaining organization is not responsible for administrative or logistical control during the perion of OPCON.[17]

(10) Direct Support (DS). A mission requiring a unit to provide support to another specific unit or organization and authorizing it to answer directly the supported force's request for assistance.[18]

LIMITATIONS

(1) Doctrine which specifically addresses light-heavy operations and sustainment is currently evolving. Key information for this study will come from handbooks and manuals which are in draft.

DELIMITATIONS

(1) This thesis will concentrate on light infantry forces that are part of the light infantry division, although three other types of infantry divisions exist (airborne, air assault, and regular infantry).

(2) The study will focus on a light infantry brigade with a heavy task force under its control.

(3) Although sustainment consists of six functions, man, arm, fuel, fix, protect, and transport, the study will concentrate on ammunition, fuel, maintenance, and transportation as those most critical to the support of a light-heavy force.

SIGNIFICANCE OF THE STUDY

The strategic role of the Army is changing based upon the changes occuring around the world. The Army is moving away from a predominantly forward deployed force to a force based in the Continental United States (CONUS).

The Army of the future must be able to project itself anywhere in the world to support strategic/operational missions. The Army will require a force that combines light and heavy forces to maximize strategic deployability and tactical capability. Light-heavy forces have sustainment needs that cannot be met by the current light infantry logistical structure. My thesis will identify problem areas that exist and make recommendations to correct problems in doctrine, organization, techniques, and procedures.

THESIS STRUCTURE

To answer the primary research question, what logistical support is needed to sustain a light infantry brigade augmented by a heavy task force?, related areas must be addressed.

In this chapter the primary subject was introduced with a discussion of light and heavy forces and their doctrinal support structure. The introduction provides the foundation for the thesis as it relates to the analysis of evolving Army doctrine in the 1990's.

In Chapter Two, the literature review, I plan to accomplish three things. First, to define the body of knowledge for the foundation of the study. Second, to

demonstrate a lack of specific information on light-heavy operations and sustainment in existing doctrinal publications. Third, to provide a background of information on light-heavy tactics and sustainment to form a foundation for further study in this field.

Chapter Three will consist of a historical perspective of light-heavy operations. This will serve to illustrate previous employment of light-heavy forces. The chapter will reinforce the viability of the tactical concpet of light-heavy and reflect the development of sustainment for these forces. The historical examples will also demonstrate the use of these forces in all levels of conflict. Furthermore, the discussion will indicate that light-heavy forces presented a number of sustainment issues that commanders and staffs had to resolve to support the tactical mission.

In Chapter Four I will transition from the history to the recent employment of light-heavy forces. In the chapter I will analyze lessons learned from rotations to the Joint Readiness Training Center (JRTC) and the National Training Center (NTC). These lessons provide feedback on recent realistic missions conducted by light-heavy forces and the problems encountered in sustaining these operations. Observations from the JRTC will focus on light-heavy operations at the task force while lessons from the NTC will concentrate on the brigade level.

After an extensive look at light-heavy lessons learned I will shift to current doctrine, force requirements and capabilities in chapter five. Doctrine for light-heavy forces is currently in the evolution stage. In the chapter I will combine information from various sources to reflect the overall tactical and logistical considerations for the empoloyment of the light-heavy brigade.

This chapter will also provide an analysis of these considerations as applied to a tactical situation. I will use a five day scenario in which I determine the sustainment requirements and capabilities of the heavy task force. The prupose of this section is to identify problem areas and then determine what sustainment units are needed to support a heavy task force which augments a light brigade. In the final analysis I will develop a table of units that may be used to support the light-heavy brigade.

Chapter Six will initially summarize the discussion and analysis conducted in the body of the thesis. This will lead to the conclusions which answer the research objective and related topics. Finally, I will present my recommendations for solving or working to solve the problems in sustaining the light-heavy brigade.

ENDNOTES

[1]Peter J. Boylan, "Complementary Force Operations," Military Review 70 (June 1990): 27.

[2]Jim Tice, "Grunts do Shuffle, Mech on the Move," Army Times 38 (April 22, 1991): 3.

[3]U.S. Army, FC 71-101, Light Infantry Division Operations (Fort Leavenworth KS: U.S. Army Command and General Staff College, 1984.) 1.

[4]U.S. Army, "The Army's Long Range Plan for Fielding Light Divisions." Report to Congress, Appendix 5 to Annex A (Washington, D.C.: Department of the Army, 1985), A-12

[5]FC 71-101, (1984), 1-5.

[6]Ibid., 1-7.

[7]U.S. Army, FM 71-2, The Tank and Mechanized Infantry Battalion Task Force (Washington,D.C.: Department of the Army, 1988), 1-2.

[8]Ibid, 1-3.

[9]Ibid,.

[10]Ibid, 7-1.

[11]Ibid, A-1.

[12]U.S. Army, FM 100-5, Operations (Washington, D.C.: Department of the Army, 1944), 7.

[13]Joseph C. Goulden, Korea, the Untold Story of the War, (New York: McGraw Hill Book Co, 1982), 115-116.

[14]U.S. Army, FM 101-5-1 Operational Terms and Symbols (Washington, DC: Department of the Army, 1985), 1-65.

[15]Ibid., 1-47.

[16]Ibid., 1-7.

[17]Ibid., 1-52.

[18]Ibid., 1-26

CHAPTER 2

REVIEW OF LITERATURE

> When suitably augmented and task organized for the mission they will be capable of operating independently at the brigade, battalion, and company level. In addition light units can be reinforced with . . . armored or mechanized forces to accomplish a specific mission.[1]

INTRODUCTION

This chapter provides a review of literature on light and heavy forces, tactics, and sustainment. The purpose of this chapter is to provide basic information on light-heavy forces to enable the reader to easily grasp the ideas and concepts which exist in this field of military science. This chapter also serves as the foundation of information used to compile this study. The reader should understand the current state of thought on this topic is changing. This is in response to the changing world situation and the Army's effort to revise the doctrine known as Airland Battle.

A number of sources exist on the employment of light infantry forces, heavy forces, and sustainment operations. The information on the combined employment of these forces

is scarce, especially light-heavy forces. The predominant source material is contained in field manuals, professional journals, unpublished thesis' or monographs, and lessons learned from the combat training centers.

One of the problems in reviewing this topic is the Army's recent desire to reduce the length of field manuals. The result is a requirement to consult a number of manuals to arrive at a single answer. For example, the original version of FM 71-3 Armored and Mechanized Infantry Brigade Operations, contained 66 pages on combat service support (CSS). The chapter discussed in detail the " how to " of brigade sustainment. The final version of FM 71-3 has only seven pages on CSS. The remaining information (from the coordinating draft) can be found in FM 63-20 The Forward Support Battalion and FM 63-2 Combat Service Support-Division.

The review of literature will discuss the following areas in relation to the light-heavy force:

Why Light and Heavy Forces?

Historical Perspective of Light-Heavy Operations.

An Assessment of the Current Light Force.

Employment Doctrine.

Sustainment Doctrine.

The conclusion will identify the principle themes and summarize the findings in this chapter.

WHY LIGHT AND HEAVY FORCES?

The idea of combining forces of different capabilities is a significant part of modern warfare. In My Reveries Upon the Art of War, published in 1757, Maurice de Saxe devotes one section to combined arms operations. De Saxe says, "I am convinced that every unit that is not supported is a defeated organization. Infantry should always be supported by cavalry and cavalry by infantry."[2] As warfare became more complex, units and branches of service became more specialized, requiring further study of the combined arms concept.

In the twentieth century technology made a significant impact on how units were organized and fought. One of these advances was the tank. The tank brought to prominence what would later be called armored or "heavy" forces. The vehicle, described as a special weapon, was actually meant to solve the stalemate of trench warfare in World War I. As a result the modern era of combined arms warfare was born. As Jonathan House writes in Toward Combined Arms Warfare: A Survey of 20th Century Tactics, Doctrine, and Organization:

> The sole purpose of this weapon was to assist the infantry in creating a penetration so that the cavalry, which had been waiting for the opportunity since 1914, could exploit into the German rear.[3]

The combination of infantry and tanks, although limited, proved to be successful by the conclusion of the War. The

same combination of forces as well as other arms and services continued to evolve through the following decades.

In the early 1980's while the Army was building up its heavy force in response to the Warsaw Pact, a series of studies determined a need for additional light forces. In 1983 the decision was made to create a light infantry division that would increase the Army's strategic deployability. The US Army Operational Concept, The Light Infantry Division provides guidance on the mission, organization, and operational functions of the division. This document along with the Light Infantry Division, a White Paper prepared by Army Chief of Staff General John Wickham, provides the cornerstone for study of the current light division. In addition to mission and organization, these works discuss the utility and focus of such a force.

The light division was created to be a rapidly deployable strategic force. As General Wickham stated:

> " . . . the division will focus on defeating light enemy forces in low intensity conflicts; but at the same time is capable of being employed in a mid-intensity conflict when properly augmented with combat support and combat service support units."[4]

Once the division became a reality, discussion began to increase on its utility in a mid- to high-intensity conflict. Major exercises such as Return of Forces to Germany (REFORGER) and the light infantry certification exercise, Celtic Cross IV, indicated that light forces could, when properly augmented, fight with heavy forces in

any environment. The ability of the light force to fight in restrictive terrain was complemented by the heavy force's mobility and shock effect. FM 100-15 Corps Operations reinforces the utility of light and heavy forces:

> In offensive operations heavy forces can lose the ability to maneuver when confronted by enemy on key terrain . . . . The light infantry is capable of conducting . . . attacks to . . . destroy enemy forces and seize terrain.[5]

HISTORICAL PERSPECTIVE

The advent of the tank in World War I brought modern light-heavy operations to the battlefield. It would, however, be the German "blitzkrieg" into Poland and France that called attention to the capabilities of such a force.[6] The German Army reorganized prior to the war to provide a mix of light, motorized, and mechanized forces within each division. The adjustments resulted in one of the most capable combined arms forces in history.[7]

The US Army recognized the German achievement and made adjustments in the division force structure between 1939 and 1942. In The Reorganization of Ground Troops for Combat, Dr. Robert Palmer discusses in detail the efforts made to organize the Army to meet the German threat. Although the move toward mobility and combined arms was evident, the effort fell short in the infantry divisions. Lieutenant General Leslie McNair, then Commander of Army

Ground Forces (AGF) made the decision to pool separate armor units at army level and attach them as needed to infantry units.[9]

Specific examples of infantry-armor operations are chronicled in a number of works. The Lorraine Campaign and The Ardennes, the Battle of the Bulge by Hugh M. Cole, provide an accurate account of infantry-armor tactics in 1944. The campaigns in France serve to illustrate many of the lessons learned by the infantry-armor/light-heavy force. There are two lessons that continue to be apparent today; the need to train and fight together on a habitual basis; and the need for the light and heavy forces to understand and work with the specific maintenance and supply needs of the opposite force.

The Korean War reinforced the light-heavy lessons from World War II. In Korea, The Untold Story of The War Joseph C. Goulden chronicles the initial action on the Korean peninsula. The North Korean Army employed a combined infantry-armor force to rapidly attack through South Korea. Although the deployment of the 24th Infantry Division slowed the North Korean advance, it was not until Army and Marine armor units were employed that the North Korean drive stalled.[9]

The Arab-Israeli War of 1973 is an excellent example of a modern high-intensity conflict. Lessons learned from the War are numerous in every field of military operations.

This conflict, once again recognized the need to combine light and heavy forces. As Frank Aker states in his book October 1973: The Arab-Israeli War, "The War showed that the tank could not be emphasized at the exclusion of infantry, artillery, missiles, and air power."[10]

Another perspective of the War comes from Israeli General Chaim Herzog in his book The Arab-Israeli War. Herzog recounts the operations of both the Egyptian and Israeli Armies. Of note are the discussions of infantry-armor tactics by the opponents. The Egyptians felt that an infantry led attack across the Suez Canal supported by heavy forces would be effective against the Israelis.[11] The Israeli Army, which had very little infantry, had difficulty with the Egyptian infantry anti-tank teams as they attempted to maneuver against the Egyptian armor.[12]

One of the first tests of the US light infantry came during Operation JUST CAUSE in 1989. Most of what is written about the conflict comes from the Center for Army Lessons Learned (CALL). "Operation JUST CAUSE Lessons Learned", published by CALL chronicles most of the key events of the operation.

The significant light-heavy operations occured when the 4th Battalion, 6th Infantry (Mechanized) was attached to the 193d Infantry Brigade (Light). The results of their missions reaffirmed earlier lessons; heavy forces have

difficulty operating for a light force headquarters. Some of the key points raised by the document:

> Armor . . . attached to infantry companies provided significant firepower . . . . Heavy units, even light armor and mechanized units, require support which light units are not organized to provide or resourced to transport.[13]

ASSESSMENT OF THE CURRENT LIGHT FORCE

Before discussing the light-heavy force it is important to understand the current light infantry force. There are numerous reports, articles, and monographs which assess the US Light Infantry. One of the most comprehensive reports is the Independent Evaluation Report for the Certification of the Light Infantry Division, published by US Army Training and Doctrine Command (TRADOC). This report covers the extensive validation process for the light infantry division. The report is significant because it provides a broad look at the organizational design, capabilities, and sustainability of the light infantry. The report concludes that the design and concept of the division are viable.

The report does make specific recommendations for adjustments in the division. It recommends additional artillery and a review of the CSS structure. The CSS structure, which employed the Forward Area Support Team (FAST) concept, was approved during the review, but

questions were raised about its ability to handle augmentation forces such as armor, mechanized infantry, and artillery.[14]

The utility of the division in a mid- to high-intensity environment was the subject of The Light Infantry on the Mid-Intensity Battlefield. This research paper was the result of a simulation using the JANUS wargame. The authors conclude the light infantry has the capability to perform in a mid-intensity theater such as Korea. To operate in such an environment the division must be employed in restrictive terrain and be heavily augmented with additional combat support and combat service support assets.[15]

Light infantry employment in the European Theater has been the focus of many studies. General John R. Galvin in his article "Heavy-Light Forces and the NATO Mission" (Infantry, July-August 1984) states a strong case for the use of light infantry in Europe. He believes the infantry can operate alone or in combination with forward deployed heavy forces. "Light brigades can take the place of heavy brigades in many . . . defensive configurations, allowing the commander to move heavy forces to places where they can be better employed . . . ."[16]

Major David L. Poston presents an in-depth look at the current light force and its capability to operate with heavy forces in his thesis, "Light Infantry Augmentation to Heavy Divisional Forces in Europe: A European Heavy-Light

Primer." Major Poston concludes that the light and heavy force combination is a viable concept in Europe. He also discusses one of the drawbacks with this force, sustainment. "To effectively employ light forces, planners must fully consider the light force ability for sustainment."[17]

DOCTRINAL EMPLOYMENT OF THE LIGHT-HEAVY FORCE

After the creation of the light infantry division combined arms doctrine initially developed a gap. Although the heavy force went to great lengths to establish combined arms doctrine, the early light infantry manuals made few references to the combination of light and heavy forces. The preface of Field Circular (FC) 71-101 The Light Infantry Division typifies the initial discussion about the light infantry concept:

> The light infantry division adds a new dimension to strategic mobility of the Army. These divisions can rapidly deploy . . . to reinforce . . . US or allied forces in NATO or the Far East. The rapid deployability will enable them to arrive in a crisis area before a conflict begins and . . . they may well prevent the outbreak of war.[18]

The preceding paragraph focuses the light infantry as a strategic rapid deployment force into a low-intensity crisis area; however it also discusses NATO which is predominantly a mid- to high-intensity environment. As the manual details the doctrine of the light division, little mention is made of the employment with heavy forces which are characteristic of NATO.

As light infantry forces participated in more mid- to high-intensity exercises, such as REFORGER and rotations to the combat training centers (CTC), some doctrinal manuals began to incorporate concepts for light-heavy and heavy-light employment. The 1990 edition of FM 71-100 Division Operations succinctly states the applicability of doctrine to light and heavy forces:

> Heavy and light forces can operate together provided the commander tailors his force to the factors of METT-T. The employment of heavy-light forces permits the commander to maximize his combat power by offsetting . . . weakness of one type unit with the strengths of the other. . . . In this sense heavy-light operations are merely an extension of the combined arms concept.[19]

FM 71-100 broadly covers the light-heavy/heavy light force from planning to preparation and execution. In each area issues are addressed by battlefield operating system (BOS) to minimize the problems for such a force. Throughout its discussion the manual reiterates the primary issue covered in FM 100-15, "the foremost consideration for employing light-heavy forces is the type of augmentation/support to be provided and the concept of combat service support."[20]

Further study indicates that more doctrine on these forces is forthcoming. The final draft of "FM 7-30, The Infantry Brigade" follows the parameters established in FM 71-100. The manual devotes an annex to the planning, preparation, and execution of brigade level light-heavy operations. It discusses, in-depth, light-heavy brigade operations and recommends the best use of the respective

light and heavy battalions. FM 7-30 covers the importance of proper task organization, "The brigade commander must determine the task organization, the appropriate command or suport relationship, the tasks to be accomplished and the CSS relationship."[21]

The most complete work on the light-heavy brigade and its requirements is Strike Operations: Handbook for Commanders, a publication prepared by the Center for Army Tactics (CTAC). It specifically focuses on the doctrine, tactics, techniques, and procedures for brigades involved in contingency operations. The handbook discusses in detail the employment and sustainment of light and heavy forces in a contingency scenario. Rather than present issues as a part of doctrine, the handbook attempts to answer these problems with possible solutions.

The recommendations, like previous sources are broken out by battlefield operating system. In the area of maneuver for example, Strike Operations identifies specific uses for each of the light and heavy battalions in a brigade attack or movement to contact. The handbook goes beyond previous sources and assumes the light-heavy brigade is deployed and conducting operations. It does not recommend a specific command or support relationship but provides techniques and procedures on how to make the relationship (Attached or OPCON) work. The manual provides one of the foundation pieces for light-heavy operations and becomes another point of departure for this study.

SUSTAINING THE LIGHT-HEAVY FORCE

The fundamental issue in sustaining a light-heavy force is a flexible, responsive support system. FM 100-5, Operations, the Army's primary warfighting manual, addresses the importance of sustainment:

> Today the US Army's ability to sustain its operations is more important as an element of combat power than ever before. To fight effectively . . . with any combination of light and heavy units, Army forces must field an adequate well operated CSS system.[22]

FM 100-10, Combat Service Support, the Army's primary CSS manual discusses broad parameters of sustainment doctrine. It reinforces FM 100-5 and defines the importance of sustainment at the tactical level, "Task Organizations are formed and reformed to support the tactical commander's plans. The execution of tactical sustainment should enhance, not slow the commander's momentum."[23]

Sustaining the light-heavy brigade is a new and unique challenge. As a result, there is little written about the doctrine, techniques and procedures of sustaining this force. Sustainment doctrine is currently written for heavy forces or light forces but little is written to provide techniques and doctrine to support a tactical force that includes both types of forces.

As with tactical manuals sustainment manuals are being revised to include more information on light-heavy/heavy-light sustainment. The coordinating draft of "FM 63-2-1 Division Support Command, Light Infantry

Division" covers in detail the light division CSS system. It stresses that the light support structure is austere by necessity and therefore must rely on significant augmentation when the division receives additional units.[24] The light brigade possesses even less of a CSS structure and will require assistance from the light and heavy forward support battalions (FSB). The creation of the light-heavy brigade will require the heavy unit to provide assets in the areas of maintenance, fuel, heavy equipment transporter (HET), and tracked ambulances.[25] FM 63-2-1 cautions however, "A light infantry FSB is not capable of of supporting a heavy battalion even if accompanied by assets from the list above.[26] The manual leaves the solution to coordination and planning, "Planners should be able to put together support packages and coordinate how they will fit into the light support structure."[27]

The question remains, What logistical structure is needed to sustain a light-heavy brigade? FM 71-100 suggests the answer may rely with the division or corps, ". . . light forces cannot logistically support heavy forces, consequently the heavy unit will be sustained by its parent division or corps."[28] FM 63-2 Combat Service Support-Division and FM 63-3J Combat Service Support-Corps do not currently address the issue of supporting the light-heavy force at brigade or division.

The only sustainment manuals that discuss the issue of division or corps support for the light-heavy force are

FM 63-21 The Main Support Battalion and FM 63-20 The Forward Support Battalion. Both of these manuals discuss the light-heavy brigade but address the same issues as raised by FM 63-2-1 in terms of maintenance, medical, fuel, and HET support. FM 63-21 goes somewhat further and warns that, "The MSB must be prepared to provide the heavy battalion additional support while it augments the light brigade."[29] The manual, however, does not define "additional support".

CONCLUSION

I came to several conclusions based upon my review of literature. First, the light-heavy force is a viable concept and definitely has a place in current operations. The second conclusion is that numerous lessons can be learned from previous light-heavy operations. The third conclusion is that sustainment of the light-heavy force is the most significant aspect hindering its tactical application. The fourth conclusion is that although improvements are being to tactical manuals, sustainment manuals still require additional information on light-heavy forces.

ENDNOTES

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[17]David L. Poston, "Light Infantry Augmentation to Heavy Divisional Forces in Europe: A European Heavy-Light Primer," (Fort Leavenworth KS: Master of Military Arts and Science Thesis, US Army Command and General Staff College, 1989), 63.

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[19]U.S. Army, FM 71-100, Division Operations, (Washington, D.C.: Department of the Army, 1990), A-1.

[20]FM 100-15, Corps Operations, (1989), A-1.

[21]U.S. Army, "FM 7-30, The Light Infantry Brigade", Final Draft, (Fort Benning, GA: US Army Infantry School, 1990), E-2.

[22]U.S. Army, FM 100-5, Operations, (Washington, D.C.: Department of the Army, 1986), 59.

[23]U.S. Army, FM 100-10, Combat Service Support, (Washington, D.C.: Department of the Army, 1988), 7.

[24]U.S. Army, "FM 63-2-1, Division Support Command, Light Infantry Division", Coordinating Draft (Fort Lee, VA: US Army Combined Arms Support Command, 1990), A-1.

[25]Ibid., A-11.

[26]Ibid., A-12.

[27]Ibid.

[28]FM 71-100, Division Operations, (1990), A-17.

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CHAPTER 3

HISTORICAL PERSPECTIVE

> We have gotten into the fashion of talking of cavalry tactics, artillery tactics, and infantry tactics. This distinction is nothing but a mere abstraction. There is but one art, and that is the tactics of combined arms. The tactics of a body of mounted troops composed of the three arms is subject to the same established principles as is that of a mixed force in which foot soldiers bulk largely. The only difference is one of mobility.[1]

INTRODUCTION

Combined arms warfare has been present for centuries. The term "combined arms", in this century, has become more popular since the tank appeared on the battlefield in World War I. "Combined Arms" may mean different things to different people. The combined arms concept is the basic idea that different arms and weapons systems must be used in concert to maximize the survival and combat effectivenss of each other.[2] Combined arms is the essence of the light-heavy force. In every major conflict in this century the US Army employed light-heavy forces. In each case these forces were task organized to maximize their capabilities and minimize their limitations.

World War II

As the US Army entered World War II it was predominantly a light force. In June 1941, the Army consisted of 8 infantry divisions, 1 motorized division, 18 National Guard infantry divisions, 2 cavalry divisions, and 4 armored divisions.[3] LTG Leslie J. McNair, Commander of the Army Ground Forces (AGF), felt that infantry battalions and regiments would be the principal combat elements. He saw armored forces being used to exploit infantry success or to pursue German armor. As a result, LTG McNair decided that supporting arms such as armor, engineers, and antiaircraft would be "pooled" (consolidated) at army or corps level and attached to infantry as needed for specific missions.[4]

Throughout 1941, owing to the success of the German armor, many planners felt the need for increased mechanization. General George C. Marshall, Army Chief of Staff, commented:

> These operations have been characterized by use and importance of armored and other special divisions and the concurrent effort to counter armored divisions in close coordination with air and motorized units from mobile striking forces of great speed and power which so far have been uniformly successful in their operations. Present trends in organization are in the direction of increasing armored, motorized, and antimechanized units.[5]

In 1942 and 1943 these comments were heeded and changes were made to combine units. These changes occured in heavy units and in infantry doctrine. The infantry division was to be:

> A general purpose organization intended for open combat in theaters permitting the use of motor transport and to have organically assigned minimum artillery and auxillary elements.[8]

The adjustments in doctrine called for regular attachment of separate tank battalions to infantry divisions. The infantry division remained similar to the organization proposed by the AGF (See Figure 3).

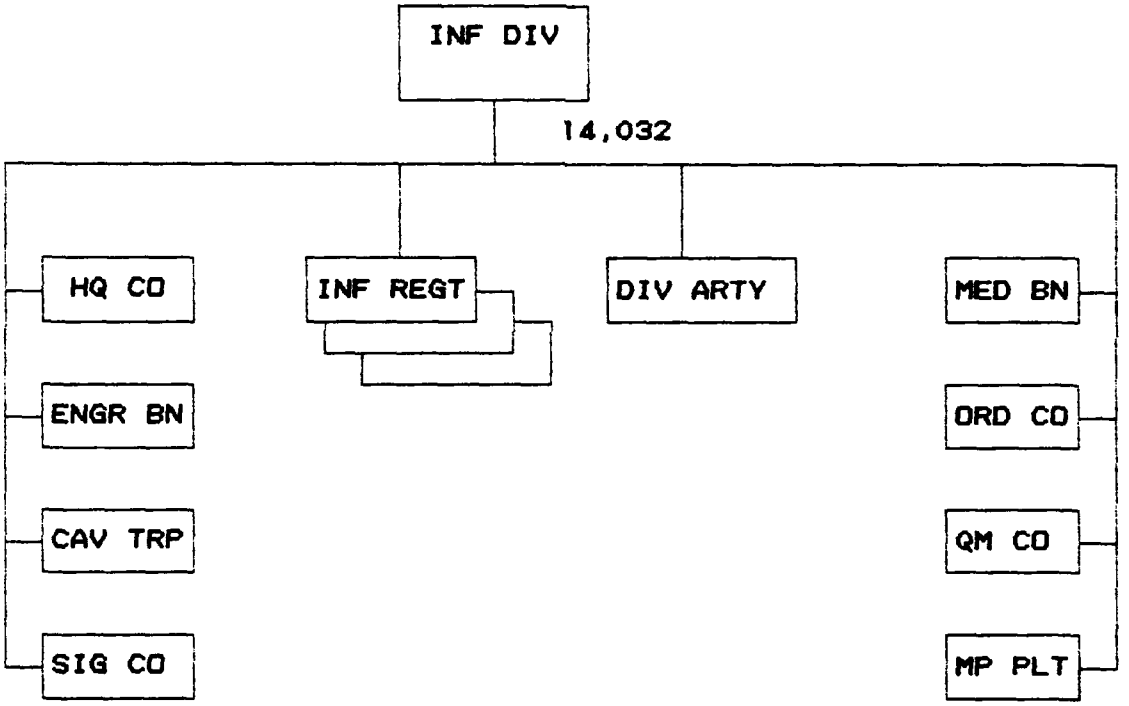


Figure 3. The Infantry Division, 1943.

SOURCE: TOE 7, Washington: Headquarters, Department of the Army, 15 July 1943.

In 1943, the Army began organizing a light infantry division. The concept called for a division that required minimum transport and fewer supply and maintenance personnel than the standard infantry division. Army leaders felt the division was necessary to meet the perceived need to rapidly project combat power in the Pacific theater of operations.[7] The AGF tested three divisions under the light division concept; the 10th Infantry Division (Pack Alpine), the 71st Infantry Division (Pack Jungle), and the 89th Infantry Division (Truck). The divisions initially trained on their own either at Camp Carson, Colorado or at the Louisiana Maneuver Area.

In February 1944 the 71st Division and the 89th Division moved to Fort Hunter Ligget, California for the final phase of testing. Prior to the deployment, Major General Thomas Finley, Commanding General of the 89th Division, passed his assesment of the initial phase to General McNair, ". . . The division has insufficient transportation to meet minimum requirements . . . and there are not enough personnel for the supply and movement of ammunition."[8]

The AGF intended for the Hunter Ligget maneuvers to determine once and for all the feasability of the light division.[9] The two divisions conducted force-on-force maneuvers from February-April 1944. The results for each phase were similar. The divisions were unable to support

themselves during continuous operations. Major General Robert Spraggins, Commanding General of the 71st Division, stated, "All supply lines were overextended . . . the division supply units were not able to supply forward combat units." General Finley's comments followed the same thought, ". . . one third of the division's infantry strength was continuously being used for the hand carrying of supplies."[10]

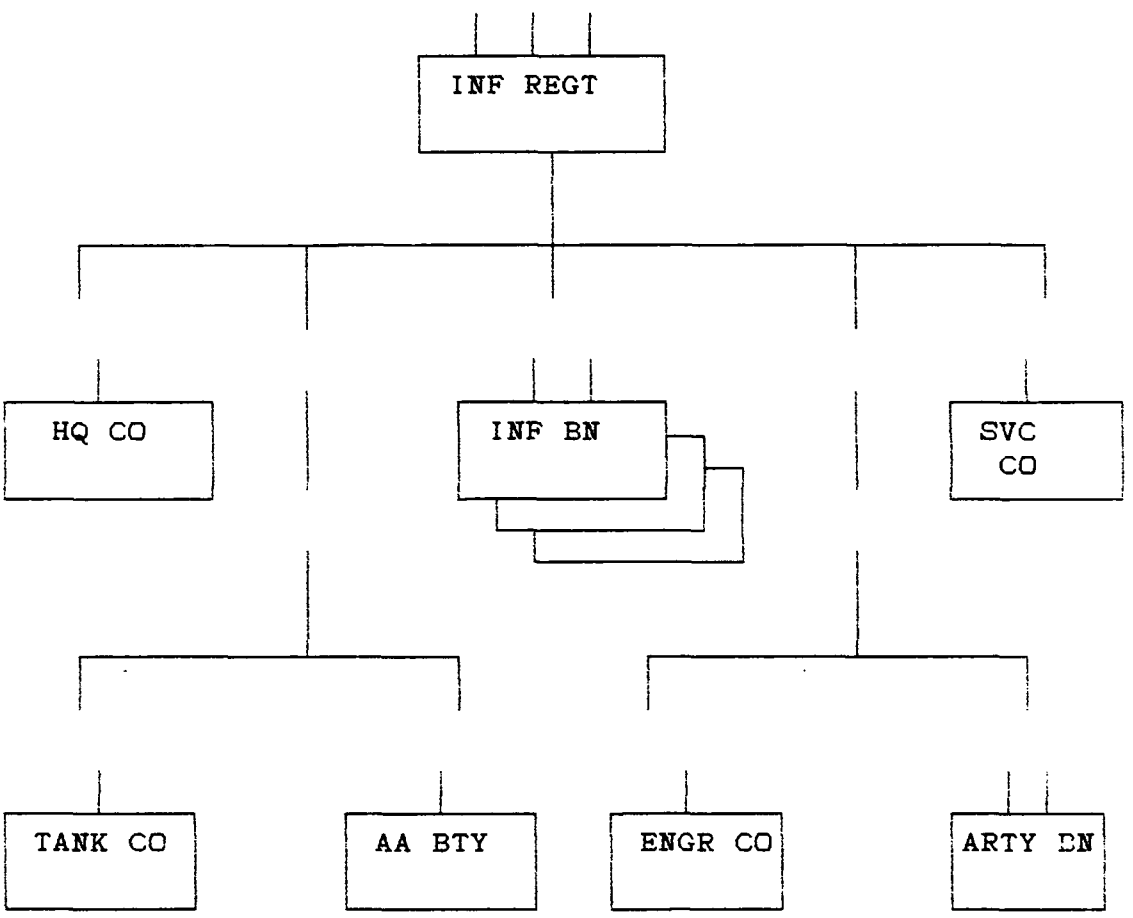
In May 1944 the AGF decided to return these divisions to the standard infantry configuration. The AGF retained the 10th Infantry Division as a light division due to its specialized capability and training for mountain fighting. The 10th Light Division (Alpine) deployed to Italy in 1945 and fought in the last four months of the War. The standard infantry division would conduct what are now called light-heavy operations as they combined foot soldiers and tanks.

The experiences of the 1st Infantry Division during the Normandy Campaign are representative of US infantry-tank combat during the War. In April 1944, the 745th Tank Battalion was attached to the 1st Division.[11] Upon landing in France the division would attach one tank company to each infantry regiment. The tank company commander colocated with the regimental command post to facilitate coordination between the company and the regimental staff. The commander

provided input on the status of supply, maintenance, and employment of his tanks.

The infantry-tank team performed well during the campaign. In the attack the tanks' mission was to get the infantry forward by placing point fire on targets that were holding up the advance of foot troops.[12] Likewise, the infantry supported the tanks by providing protection from the "panzerfaust" (antitank weapon) and enemy rocket launchers. The tactic of task organizing tanks with infantry regiments became commonplace within US infantry divisions. Although tank platoons were attached to infantry battalions, this was the exception. Tactically and logistically it was better to task organize at the regimental level.

In certain situations divisions would form regimental combat teams. The divisions formed these teams for specific missions or special operations. When organized, the regimental combat team resembled the current task organized brigade (Figure 4). A regimental combat team was almost a self contained fighting force. The base was an infantry regiment. The unit maintained its organic combat support and combat service support structure. The regiment received attachments consisting of tanks, artillery, engineers, and antiaircraft units. Additional CSS support came from army level.



NOTE: One or all of the four above units may augment the regiment for a specific operation.

Figure 4. The Regimental Combat Team.

SOURCE: TOE 7, Washington, DC: Headquarters, Department of the Army, July 1943.

Logistical support for all divisions and regiments was similar. The logistical structure existed from battalion through army. The divisions and corps were not logistical operators. Divisions were to be lean and simple with attachments made as necessary. The corps was purely a tactical headquarters that could handle any mix of infantry and armored divisions.[13] The field army allocated divisions to the corps and attached combat support and combat service support assets as needed.[14]

> For the routine supplying of food, gasoline, and ammuntion, the regiments and battalions will deal directly with non-divisional service units under army control. . . . supplies are to move with as much freedom as possible through as few channels as necessary. Divisions and Corps are not in the channel of supply except in emergencies.[15]

An army normally controlled one or more functional support groups. During the Lorraine Campaign, for example, Third Army controlled two ordnance groups and one quartermaster group. Logistical units organic to the division consisted of an ordnance company and a quartermaster company. These companies supported the division headquarters and acted as a reserve for regimental service companies.

The regimental service company provided the primary CSS support for the infantry-tank team. The company transported supplies, fuel, and ammunition for the regiment. The company hauled supplies in its own trucks from field army supply points that were often 20-30 miles to the rear.

The field army was responsible for pushing supply points within reach of forward regiments.[16]

Maintenance support for the tanks came with the tank battalion. To make attachment and detachment easier all armor battalions were administratively self contained.[17] The battalion service company conducted tank maintenance and repair parts resupply. Based on the mission the battalion would receive additional maintenance support from an ordnance company attached from army.

Although designed for speed, flexibility, and easier task organization, the CSS structure presented problems. The system required army to be fully aware of regimental activities in order to provide adequate support. When this did not occur tactical operations lost momentum while regimental service units travelled extensive distances to rearm and refuel. The division G-4 attempted to resolve problems but he could do very little since he (division) did not own the CSS units. The regimental S-4 often spent much time travelling to solve supply problems when tanks were attached to his regiment.

The Army's first large scale infantry-tank operations provided many tactical and logistical lessons that were addressed between 1945 and the outbreak of hostilities in Korea. The principal tactical lessons were: 1) the need to be employed as a combined arms force; 2) the need for better coordination between the infantry regiment and attached tanks; 3) the requirement for regular training between the

two units to reduce cross-attachment problems. The logistical lessons included: 1) more emphasis on forward support; 2) the need to include the division or corps in the logistics chain to assist in resolving problems; 3) the need to establish a better organization to support cross-attachment of tanks to infantry units.

> It is felt in future wars the infantry-tank team will be the great striking force. Such a team should not be made up on the battlefield but must be trained long before battle. Its men must know each other well, must work together, and must learn each others capabilities and limitations.[18]

This quote, from 1946, summarizes the thoughts of many officers following the war. The task that remained was to develop a system that addressed the basic needs of the force.

Following World War II the Army moved to correct the deficiencies in infantry doctrine. The division would maintain its triangular base of three regiments but changes were made to make it a combined arms organization. The new structure placed a tank company in each infantry regiment as well as a tank battalion at division. For the first time the Army organized a permanent light-heavy force. As one officer commented:

> A new era had begun for the infantry division an era in which the infantry division may be as spectacular in its employment of mobility and firepower . . . and still retain its ability to fight successfully on any type of terrain.[19]

The infantry-tank team at regimental level was designed to provide various capabilities. The tank company

added offensive power by applying its firepower and shock effect. The company could destroy other tanks and provide close-in direct fire support for the infantry.[20] The infantry continued its role of securing ground and protecting the tanks.

Reorganization occured throughout the echelons of support. Doctrine established specific responsibilities at each level of command. The field army was responsible for long range planning, supply, and evacuation lines for ammunition, transportation, and facilities.[21] Corps retained its role as a monitor, not an operator. Its only requirements were with respect to corps troops.

The most significant change came at the division. The division became a logistics operator. It was responsible for providing supply points for most classes of supply (except ammunition) and for coordinating assistance from army through regiment. The organic ordnance maintenance company increased in size to support the division's requirements. It became responsible for ordnance supplies, maintenance support for divisional units, and the management of ammunition supply.[22] The quartermaster company also grew in size and mission. It was responsible for management and issue of food, fuel, and weapons replacement.

The regiment saw only minor changes in its support structure. The changes occured in supply and maintenance. The regimental service company increased in size and capability with the addition of trucks and a maintenance

section. The trucks were needed to haul increased quantities of ammunition while the maintenance section provided support to the tank company.

The changes in organization presented new sustainment problems for the regimental infantry-tank team. The regimental supply officer's job became more complex with the additional requirements of the tank company. He could no longer pass these problems off to the parent tank battalion. Supervision of tank maintenance now became a key function for the regimental motor officer. Most of his time would be spent managing tank maintenance in addition to supporting the trucks and jeeps needed to sustain the regiment. Most infantry officers were unprepared for the additional responsibility. As one tank commander pointed out, ". . . very few infantry officers know anything about tanks, during operations little cooperation or coordination occured between the motor officer and the company motor sergeant."[23]

KOREA

The Korean War began with the North Korean Army employing its own infantry-tank team. In June 1950 the North Koreans launched an all-out offensive into the Republic of Korea. The lead regiments consisted of task organized infantry and armor units. Although the terrain was considered unsuitable for armor the North Korean columns of infantry were led by tanks.[24] North Korean armor overwhelmed South Korean forces while the infantry secured

objectives. When South Korean or the initial US forces managed to halt North Korean tanks they found themselves outflanked by infantry.[25]

When the war began the only US units available for action were four infantry divisions performing occupation duty in Japan. As of 1950 the divisions had not completed conversion to the new tables of organization and equipment (TOE). As a result they did not have tanks or the full support structure to sustain them. The 24th Infantry Division deployed the first units to the Korea consisting of the 21st Infantry Regiment. The 1st Battalion, under command of LTC William Smith, formed a task force of infantry and artillery to assist the Republic of Korean Army (ROK).

During the fighting at Osan in July 1950, Task Force Smith saw first-hand the success of the North Korean infantry-tank team. The Task Force, without tanks, engaged a battalion of 33 enemy tanks destroying only four.[26] The battalion was followed by three tanks and a regiment of North Korean Infantry. The Task Force destroyed much of the infantry but was quickly encircled by the tank battalion and remaining infantry.[27]

The US Army called upon an infantry-tank team to stop the North Korean advance. In July 1950, the 89th Tank Battalion arrived in Korea for assignment to the 24th Infantry Division.[28] In accordance with doctrine, tank companies initially fought with the infantry regiments.

Infantry-tank tactics were similar to World War II. In the defense/delay by US forces infantry stripped away the North Korean infantry while the tanks slowed the North Korean armor. In the offense the tanks provided close-in support to the infantry who cleared the restrictive terrain.

As in previous wars coordination became a problem for many units. The fact that the infantry divisions in the Pacific completed reorganizing to the new TOE as they fought their initial battles magnified the problem. By late 1950 all infantry divisions were organized in accordance with the new division structure.

The 25th Infantry Division found a way to address the coordination problems. The division published a Standard Operating Procedure (SOP) to supplement the doctrinal manuals.[29] The SOP covered capabilities, limitations, and sustaiment issues on fuel, ammunition, and maintenance. The idea was very successful as the SOP became a leaders guide for the employment of the infantry-tank team.[30]

Although some divisions employed SOPs, the procedures of sustaining the infantry-tank team proved a significant problem in Korea. The adjustments made in sustainment doctrine since 1945 were known to logisticians in Korea, however, they had not been practiced in training, much less in combat.

The combat service support system began at 8th Army. Army level units established supply depots and truckheads to provide support to divisions and regiments. Army, however,

also retained responsibility for theater logistics on the Korean peninsula. This put a previously unknown stress on the logistics system. Often, the army would turn over depots to divisions operating in the area. The stress incurred by army now passed to division. In one instance 3d Infantry Division supported 44,000 personnel.[31] In addition to organic and attached units the division supported other units such as, South Korean forces, United Nations forces, and corps units in the area.[32]

The division, which became a logistics operator in Korea, established supply points for all classes of supply except ammunition. The division also provided backup maintenance and recovery assets for its assigned units. Once division established its facilities, the regiment was responsible to dispatch trucks to pick up food, fuel, and repair parts. The regiment drew its ammunition from army ammunition supply points (ASP).

After the first months of the war it became apparent that Korea would be different from World War II. A combination of physical and technical problems confronted the logistics system. These ultimately impacted on operations at the regimental level.

Physical problems consisted of terrain and tempo. The broken, cross-compartmented terrain caused infantry divisions to operate over wide frontages. Although units had additional transportation assets based on the new TOE, the terrain and tempo of operations on taxed these assets

with increased distances and time requirements.[33] The tempo, for example, caused supply points to move frequently. In the early months of the conflict division would withdraw logistics facilities just ahead of the North Korean attacks. After the Inchon landing division facilities could not be displaced fast enough to keep up with advancing regiments.

The technical problems occured within the division. The issue of supporting infantry and tanks compounded by the physical hurdles placed a significant strain on the sustainment system. Overall there was a lack of adequate support from division through regiment.[34]

The division, with increased logistics personnel and units, could not support itself. A survey conducted by the Ordnance Department found the division quartermaster and ordnance untis could only support 60 % of the division's organic requirements.[35] As a result, the division supply points were not able to keep pace with the demands of forward units. The fact that the divisions deployed to Korea did not have organic tanks prior to deployment compounded this problem. Very few staff officers understood how to support tanks.[36] As one officer stated, "It was quite difficult for infantry units, regardless of level . . . to realize the amount of supplies consumed and the transportation required to support it."[37]

Sustainment for the combined arms team put a stress on the regiment and its organic service company. The principal problem was transportation. The addition of an

organic tank company, with only a slight increase in trucks, reduced the regiment's ability to haul supplies, ammunition, and fuel. The regimental supply officer improvised to solve the problem. In terms of ammunition most supply officers worked to have army throughput ammunition to temporary ASPs at division. To reduce supply trips regimental trucks going to division would back-haul supplies, prisoners, and wounded. Finally, if a regiment was moving near a railhead, division attempted to move supplies forward allowing the regiment to transload from rail to their organic transportation.[38]

Maintenance and recovery became a detractor to infantry-tank operations. The change in organization provided additional mechanics but many were not assigned when units deployed to Korea. The lack of personnel increased repair time on tanks and reduced the ability to provide contact teams to the tank company maintenance section.[39] The other problem was recovery. Although the tank company maintained a recovery vehicle, the regimental service company was not authorized one under the new TOE. The regiment required assistance from limited assets at division or additional recovery support from army when more than a few tanks broke down.[40] Improvisation and coordination discussed above ultimately worked to reduce the sustainment problems for the infantry-tank force.

The lessons from the Korea War were apparent before the conflict ended. The combined arms team continued to be

an effective fighting force. Logistically, however, the conflict revealed many problems associated with sustaining the force. Although adjustments were made after World War II, many problems did not change. As one regimental commander stated, "The commanders of units with attached tanks do not have sufficient knowledge of . . . tanks and often assign missions that interfere with the proper maintenance and operations of the tanks."[41]

The lessons from Korea indicated the following:

1) The infantry-tank team must work and train together before battle. This will reduce problems in employment, coordination, and sustainment.

2) The infantry regiment, as organized under the new TOE, is incapable of assuming maintenance and supply responsibility for organic armor units, even if supported by the division.[42]

3) The infantry division needs more than a quartermaster company for sustainment. Although the quartermaster and ordnance units increased in size after World War II, the greater capability did not meet the requirements. The division with organic tanks at the division and regiment and attached weapons systems cannot sustain itself. Requirements exceed hauling capacity of using units even when augmented with other division assets.[43]

1973 Arab-Israeli War

An example of the effectiveness of light-heavy forces in a recent conflict comes from the Arab-Israeli War of 1973. Although fought largely by mechanized and armor forces, the conflict reflected the utility of light and heavy forces in high-intensity combat. The war showed that the tank could not be emphasized at the exclusion of infantry and other combat arms.[44] Prior to the war, the Israeli infantry was neglected at the expense of armor.[45] This was based on Israel's experience from the Six Day War in 1967. The studies from that war indicated that infantry slowed armor operations. As one report stated:

> Since halftracks in use . . . had been inadequate . . . and infantry could not keep up with the tank . . . personnel tended to discard infantry in their plans.[46]

As a result there were few infantry units in the Israeli Army in 1973.

Egyptian intelligence recognized the Israeli weakness. As Egypt planned for war they understood a combined light-heavy force would have a distinct advantage against the Israeli Army in the Sinai. Infantry could infiltrate Israeli defenses, secure terrain, and establish antitank ambushes. Heavy forces could follow to provide mobility and firepower to the attack.

In October 1973, the Egyptian Army attacked across the Suez Canal with with a combination of infantry and rangers leading. The light forces seized key terrain and attempted to destroy Israeli tanks with grenade launchers

and Sagger missiles.[47] The Egyptians followed the light forces with three mechanized divisions and two armor divisions.[48] In less than six hours 80,000 men crossed the Suez Canal on a 170 KM front.[49] The Egyptian plan worked. The use of a combined arms force and the element of surprise enabled the Egyptians to rapidly seize a considerable amount of terrain in the Sinai.

The Israeli Army reacted quickly, counterattacking with armor and airpower. As the campaign began Israeli armor suffered significant losses to the Arabs. Egyptian anti-tank ambushes inflicted heavy losses on Israeli tanks. One Israeli officer said, "Our armor stormed enemy positions without infantry . . . in wasteful battles."[50]

The Israeli Army overcame their combined arms difficiencies by reorganizing many brigades and divisions. Infantry, once again, became a partner in the Israeli combined arms team. The Israelis, predominantly used mechanized infantry to support tanks. It allowed armor units to maintain their tactical momentum by making only minor changes in doctrine. Israeli light infantry consisted of specialized units such as light infantry or paratroop brigades which were task organized with heavy forces for specific missions.

One of the key lessons to come from the Israeli success was their sustainment system. The Israeli combat service support system (CSS) often turned ineffective units

into effective organizations overnight. Much of the success lies in the tactical sustainment of the army.

The CSS system centers around the division. The division maintains a support regiment which is responsible for all logistical support of organic and attached units. It is a multifunctional organization that provides supplies, fuel, ammunition, and maintenance support for the forward brigades. Each brigade has an organic support company that is responsible for similar functions for brigade units.[51] Due to the predominance of armor the support company also coordinates with division for mobile logistics units. This is a push package of fuel and ammunition for forward brigades.[52]

The system remained in place with minor changes throughout the war. The benefits of the system led to many of the Israeli successes and had an impact on current US sustainment doctrine. The mobile logistics units kept the divisions and brigade supplied with fuel, allowing the army to maintain momentum against the Arabs on both fronts. The only significant problem rested with ammunition. The past experiences did not prepare the CSS system for a high-intensity armor conflict. The expenditure of ammunition was inordinately high, which overwhelmed the transportation system.[53] The Israeli Army reconfigured many trucks to haul ammunition and ultimately pressed the civilian fleet into service to meet the demand.[54]

While ammunition strained the logistics system, maintenance became a combat multiplier. The Israeli use of the forward maintenance concept turned many unts around within hours. Support regiments and companies tailored contact teams for specific units. These teams with organic transportation worked directly for forward units and performed repairs on-site. During one operation a maintenance unit repaired a company of tanks overnight. The unit began the next engagement with thirty-three tanks instead of twenty-three.[55]

There were numerous lessons from the Arab-Israeli War. The conflict confirmed the need for complementing infantry and tank operations on a high-intensity battlefield. The war demonstrated that high-intensity armored engagements would produce significant consumption rates for fuel and ammunition. When put together, however, the significant lesson that arises from the Arab-Israeli War is the validation of the combined arms team supported by a flexible, effective logistics system.[56]

OPERATION JUST CAUSE

The opportunity to employ light-heavy forces in a low-intensity conflict came in 1989 when the US invaded Panama. Operation JUST CAUSE was the largest contingency operation conducted since World War II.[57] It involved forward deployed elements from US Southern Command (SOUTHCOM) and units under control of XVIII Airborne Corps.

The operation consisted primarily of small unit actions due to the diverse terrain and numerous built-up areas.

During the operation the predominant light-heavy organization consisted of a mechanized infantry battalion from the 5th Infantry Division attached to the 193th Infantry Brigade (Light). The battalion was attached because the remainder of the 5th Infantry Division did not participate in the operation. During the initial phase of the operation the brigade's mission was to seize key facilities along the Panama Canal and areas within Panama City.

The nature of the mission and terrain called for decentralized operations. Consequently, the primary form of employment consisted of a light task force with a heavy company under its operational control (OPCON). The method of employment allowed the simultaneous engagement of many objectives. In many missions the heavy forces used their firepower, shock, and mobility to destroy perimeter defenses while the light forces cleared the objective. In one engagement units of the brigade attacked the Commandancia complex in Panama City. The operation began with mechanized infantry supported by Sheridan tanks assaulting the outer portion of the complex. These units were quickly followed by a battalion of light infantry which cleared the outer buildings.[58]

The command-support relationship and tactical situation affected the method of logistical support. The

infantry brigade, being a separate organization, had an organic support battalion. The battalion consisted of a medical company, maintenance company, and a supply company. Support above the brigade came mainly from US Army South (USARSO), the Army component of SOUTHCOM. The heavy task force maintained its organic support units consisting of a support platoon and a maintenance platoon.

During JUST CAUSE the 193d Infantry Brigade encountered problems trying to sustain the light-heavy force. Requirements for food, fuel, ammunition, and repair parts quickly exceeded the heavy battalion's transporatation capability, even though the battalion received additional support from its parent brigade prior to deployment. The support battalion, which had a number of support requirements for USARSO, provided limited backup support to the task force. Maintenance support for heavy equipment was extremely limited as few units in Panama possessed any heavy assets. As one observer noted:

> Light infantry units are not equipped to move bulk fuel, large caliber ammuntion, and spare parts. Heavy units . . . require support which light units are not organized to provide or resourced to transport. Units must carefully task organize to ensure an adequate dedicated support slice is provided.[59]

Ultimately, the small area of operations and short duration missions kept sustainment problems from adversely impacting on the outcome of the operation.

SUMMARY

History presents a number of examples of light-heavy operations and their sustainment. Studies presented in this chapter reflect the use of light-heavy forces throughout the spectrum of conflict, low-, mid-, and high-intensity. The lessons indicate the light-heavy concept is applicable in varying terrain from western Europe, to the Middle Eastern desert to the small urban areas of Central America.

The lessons learned from past battles demonstrate that many issues reappear in light-heavy operations. Recurring tactical lessons include:

1) The need for coordination between light and heavy units prior to employment.

2) Regular training exercises for the light-heavy force to increase knowledge of capabilities and limitations.

3) Habitual task organization of light and heavy units to increase knowledge of different systems especially in the area of logistics.

4) The inability/incompatability of the light CSS system to support and interact with heavy forces.

5) The need for specific doctrine to discuss the employment and sustainment of light-heavy forces.

History points to a continuing problem, how to adequately sustain the light-heavy force mix. As indicated above the light-heavy force has requirements which must be addressd by the logistic system to support tactical

operations. In each conflict discussed, sustainment played a role that detracted from the role of the light-heavy force.

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CHAPTER 4

ANALYSIS OF LESSONS LEARNED FROM THE COMBAT TRAINING CENTERS

> As a global power, the United States must have an Army capable of meeting a broad range of security requirements. It must be a balanced force consisting of heavy, light, and special operations forces. Furthermore, to be an effective deterrent . . . each of those elements . . . must consist of organizations whose soldiers and leaders are well trained to respond effectively to contingencies across the entire spectrum of conflict.[1]

INTRODUCTION

In the previous chapter we identified that history provided a number of invaluable lessons about the employment and sustainment of light-heavy forces in combat. With the exception of Operation JUST CAUSE, the conflicts occured prior to the creation of the light infantry division in 1984. Consequently, the Army must look at recent training operations to identify the capabilities, strengths, and weaknesses of the current light-heavy force. In this chapter I will discuss light-heavy lessons learned from the Army's most demanding training experience, the combat training center (CTC).

Combined arms training at the Combat Training Centers (CTC) began in 1982 at the National Training Center (NTC) at

Fort Irwin, California. Since then the training concept expanded to include the Joint Readiness Training Center (JRTC) at Fort Chaffee, Arkansas and the Combat Maneuver Training Center (CMTC) at Hohenfels, Germany. The focus of the CTCs is to provide realistic multi-echelon training for heavy, light, and special operations forces. They allow Army units to prepare to fight in a joint and combined environment. The focus of my analysis will be on lessons from the JRTC and the NTC. The CMTC only recently began heavy-light/light-heavy rotations and insufficient data exists on operations by light-heavy forces.

The JRTC opened in 1987. Its focus is on light forces operating in a low-to mid-intensity environment. Training at the JRTC is accomplished by all forms of light forces; light infantry, airborne, air assault, ranger, and special forces. The training at JRTC concentrates on the battalion/task force while the brigade is only a player with respect to command and control. While one task force physically maneuvers, the brigade fights another task force in the command post exercise (CPX) format. Consequently, light-heavy operations at the JRTC are predominantly conducted at the battalion level.

The NTC's focus is on the heavy force within Forces Command (FORSCOM). Training at the NTC is conducted primarily by heavy brigades and cavalry squadrons. The NTC also concentrates on the battalion/task force, but the brigade is a full participant. Operations with light and

heavy forces have been predominantly heavy-light rather light-heavy. In each of these cases task organization occured at the battalion and brigade.

Rotations to the CTCs provide the Army with a valuable training tool. Units must perform their wartime tasks under very realistic conditions. They must conduct reconnaissance, maneuver, and combat service support while fighting a continuous operations battle. As stated in FM 25-101 Battle Focused Training:

> Each center provides . . . forces with hands-on training in a stressful environment built to exercise the unit's mission essential task list (METL). The centers provide realistic integration and portrayal of the joint and combined aspects of war, and facilitate unit training in Airland Battle doctrine to mission training plan (MTP) standards.[2]

During the rotation units participate in a scenario which appproximates a campaign or major operation. They face a dedicated opposing force (OPFOR) that employs current threat doctrine and tactics. To provide accurate feedback during training each CTC maintains an operations group. This organization provides observer/controllers who provide feedback to the unit according to the seven battlefield operating systems (BOS).

The information comes to the unit through one-on-one coaching and formal after action reviews (AAR). As stated by Major General Glynn Mallory, former Deputy Chief of Staff for Training at Training and Doctrine Command (TRADOC),

> "The AAR is an interactive process in which unit leaders and observer/controllers review in detail both strengths and weaknesses the unit displays in executing individual, leadership, and collective skills during operations."[3]

In addition the unit receives a written take home package to use in the development of home station training plans.

The CTC concept benefits all units through the collection and analysis of lessons by the Center for Army Lessons Learned (CALL). The Center collects and categorizes lessons from the CTCs and major Army exercises such as Return of Forces to Germany (REFORGER) and maintains them in a permanent data base. This allows the CTCs, monitored by TRADOC, to serve as "laboratories" for doctrine, tactics, techniques, and procedures.

LESSONS FROM THE JRTC

Lesson from the JRTC primarily come from light-heavy task force operations. For this study, the data comes from a number of rotations in order to provide a broad look at light-heavy issues. The scenario involves a light task force operating as part of a light infantry brigade. During the operation the light task force receives a tank company for a specific mission or series of missions, usually one attack and one defense.

The offense missions are generally deliberate attacks where the light-heavy force can capitalize on the ability of the light infantry to infiltrate or secure restrictive terrain while supported by tanks or infantry fighting vehicles (IFV). The defense missions may consist of a

battle position or a sector defense. In these missions the light infantry establish their defensive positions while the tanks are usually employed in-depth in terrain that will maximize their ability to counterattack by fire and maneuver.[4]

Observations from the JRTC indicate the light-heavy force creates unique problems in planning and executing sustainment. These problems affect how the task force operates and ultimately how it fights.

Command and Control

The operations order (OPORD) task organizing the tank company to the light task force must specify the command/ support relationship. When the relationship is not specified it results in confusion and a fragmented sustainment effort.[5] In one situation a light task force knew it could not support a tank company and assumed that the tanks were under their operational control (OPCON). The tank company and its parent task force were not sure of the relationship causing the tanks to receive limited external support. For example, the tank company received fuel late on one mission because the respective task force's thought the other was responsible for logistical support.

This illustrates a key issue of task organization below the brigade level for light-heavy units. The light infantry task force cannot sustain a heavy unit. The task force's only organic logistics unit is its support platoon.

The platoon consists of nine high mobility multipurpose wheeled vehicles (HMMWV) with trailers.[6] These vehicles provide dry cargo supply and transportation support to the infantry task force and do not have the ability to also support the needs of the tank company.

The relationship of OPCON requires a dedicated support package for the heavy unit. The dedicated support package reduces the time lost in resupplying the heavy unit from its parent organization. The package also insures the correct number and type of vehicles are available to provide the heavy unit with fuel, ammunition, and resupply when conducting operations for another unit.

During light-heavy operations the forces must be integrated to maximize their capabilities and reduce problems. For example, as one task force planned an operation it did not consult the tank company commander in reference to the capabilities and limitations of his unit. Consequently, the company did not receive a doctrinal mission.[7]

The lack of integrated planning affects sustainment for the light-heavy force. Since the tank company commander was not present for the planning process, the task force S-4 was not fully aware of the tank company requirements. He coordinated later with commander to update his concept of logistical support. This delay in coordination delayed the

S-4 and tank company executive officer in making arrangements with the parent heavy task force to get the necessary fuel and ammunition.

Supply and Transportation

While the tank company was OPCON to the light task force resupply was slow and sometimes late due to coordination problems and the distances between the company and the heavy task force. The light task force has limited capabilities to assist in these areas. Its only organic fuel capability is two 500 gallon fabric bags and a pump. The tank company, therefore, must come with sufficient refuel capability. In this example the company came with one 2500 gallon fuel truck, which was insufficient for the company's needs based upon the mission.[8] Although FM 71-2 The Tank and Mechanized Infantry Task Force recommends two fuel tankers based upon mission requirements, the S-4 felt one would be sufficient. The company subsequently experienced a delay in movement as the fuel truck returned to the parent heavy task force to be replaced by another vehicle.

Similar problems arose concerning transportation and ammunition. The tank company received one five ton cargo truck to haul ammunition due to the OPCON relationship. Once again the heavy task force S-4 did not estimate the company's needs based on the mission requirements and sent what he felt was sufficient. Consequently, resupply became

a problem after one mission as one truck could not haul the total ammunition needed by the tank company. The parent unit dispatched a second cargo which resolved the problem.

The above examples emphasize that OPCON alone, is not the answer to light-heavy supply issues. The headquarters creating the light-heavy force must understand the supply needs of the heavy force. Planning for the OPCON of the heavy force must address types of missions expected and the duration of the command/support relationship. This information, in addition to an estimate of the requirements, will allow planners to tailor an adequate support package to accompany the heavy unit while it augments the light task force.

Maintenance

Light sustainment emphasizes replacement over repair while the heavy force emphasizes the "fix forward" concept. Additionaly, the two forces have significant differences in equipment. The vehicles in a light division are predominantly wheels rather than tracks. Therefore, light units do not have the maintenance personnel required to repair systems such as tanks and infantry fighting vehicles (IFV).

Since the tank company was OPCON, its parent unit retained organizational maintenance responsibility. When the company came to the light task force it brought its maintenance section from the heavy task force. This section

can only conduct minor repairs and limited recovery when detached from its parent organization. This presented problems similar to the ones identified earlier as the tank company had to coordinate with its parent task force for any additional support. A number of tanks were inoperable for long periods until the battalion maintenance section came forward to assist in repairs or until the company recovered these vehicles back to a maintenance collecting point.[9] This example from from the JRTC illustrates the need for a support package tailored for mission requirements when a heavy unit is OPCON to a light force.

LESSONS FROM THE NTC

The source of light-heavy lessons from the National Training Center is Rotation 90-8. During this rotation light, heavy, and special operations forces conducted a contingency operation in a mid-to high-intensity environment. This was the first light-heavy rotation conducted at the NTC. During much of the fourteen day scenario, elements of the 1st Brigade, 7th Infantry Division (Light) and the 5th Battalion, 16th Infantry from the 1st Infantry Division (Mechanized) conducted operations as a task organized light-heavy brigade.

The lessons discussed come from the brigade operations phase during which light-heavy forces trained at the brigade and task force levels. Due to the contingency scenario, the heavy task force was attached to the light

infantry brigade. This brought about a series of issues associated with task organizing light-heavy forces such as, the effect of the command/support relationship on sustainment, the amount of support a heavy force needs when attached to a light infantry brigade, and the organization/command and control of the CSS units in support of the light-heavy brigade.

General Observations

The overall outcome of the rotation revealed that light-heavy operations remain a valid concept. Tactics, techniques, and procedures (TTP) must be refined to enhance the integration of light-heavy forces.[10] The results identified the need for more doctrine for the employment and sustainment of light and heavy forces. In many cases at the task force and brigade levels infantry commanders did not appreciate the capabilities and limitations of the light-heavy force both tactically and logistically.[11]

One of the key issues that came from the rotation was that existing sustainment doctrine must be adapted to support light-heavy forces. As discussed earlier a light-heavy force presents many challenges to the respective planners. In this situation planners did not fully coordinate and integrate in order to resolve the differences in light and heavy sustainment concepts. Consequently, during the exercise units and staff performed CSS in an ad-hoc manner with "chaos as the result."[12] The overall

analysis of the light-heavy brigade CSS system resulted in the following observation:

> Current CSS systems of the light forces are not compatible with the system used by the heavy force. Until a common system covering the spectrum of combat service support from . . . management of supply, to transportation and maintenance is implemented, light-heavy operations will be tenuous at best.[13]

Command and Control

The current CSS structure for light sustainment does not support the light-heavy force. The forward area support team (FAST) concept hindered planning, preparation, and execution of brigade logistical support. The brigade S-4 and forward area support coordinator (FASCO) did not possess the staff or communcations capability needed to coordinate support for a heavy attachment.[14] In addition, the supply, maintenace, and transportation generated by the brigade and heavy task force exceeded the FAST capabilities. The S-4 and FASCO worked continuously trying to manage the requirements. However, when one problem was solved others arose. Without a staff, as is found in a heavy forward support battlion, the FAST could not track current tactical operations and conduct rear battle functions while trying to rectify sustainment issues.[15]

The lack of coordinated command and control in the brigade support area (BSA) led to fragmented support. The light sustainment units located with and remained under control of the brigade S-4 while the heavy support package was colocated but not integrated into the BSA.[16] The result

affected tactical operations. On one occasion there were twelve of twenty-eight tanks and ten of thirty-four infantry fighting vehicles (IFV) inoperable. The S-4 was unaware of this situation, although the information was present in the heavy task force support area.[17]

These observations add to the on-going debate over the light infantry support structure. The light division and brigade clearly require the improved command and control and responsiveness found in the FSB structure. The NTC rotation and other exercises demonstrated the FAST concept was no longer adequate for the light infantry needs. In the current design the FASCO is inadequately staffed to coordinate sustainment in the BSA and, at the same time, provide command and control of the functional companies in that area.[18] In August 1990 the Army Chief of Staff, General Carl Vuono, approved the provisional restructuring of the light division support command (DISCOM) to the forward support concept.

The forward support battalion (FSB) possesses superior command and control capabilities over the FAST concept. The subordinate companies are similar. However, the FSB has an organic battalion commander and staff in contrast to a major and three enlisted assistants in the FAST. The FSB provides the brigade commander a single, responsive, multifunctional point of contact to meet sustainment needs.[19] The FSB commander, staff, and the brigade S-4 work together to provide the capability to

command and control sustainment operations, rear battle functions, and track the tactical situation. The system will establish a continuous, responsive structure to plan and coordinate support for complex light-heavy operations.

Supply

Supply operations presented a series of problems for the light-heavy force. Fuel consumption for the heavy task force went well beyond amounts estimated by the light infantry. As a result, the problem in fueling the task force became a lack of understanding of the heavy force requirements and poor coordination to insure forecasts were verified between light planners and the task force S-4. In one example, initial forecasts were not adequately coordinated with the task force S-4 resulting in a shortage of fuel for one mission. It should be noted that, unlike observations from the JRTC, the light-heavy brigade had sufficient assets to transport fuel. The heavy support package brought five 5,000 gallon tankers from its parent DISCOM to meet operational needs.

Ammunition support for the light-heavy force was marginal. The problem resulted from insufficient planning and coordination between the light and heavy elements. Once again the brigade S-4 and FASCO dealt with consumption factors much larger than normal for the light brigade. The types of ammunition required by the heavy task force (tank, chain gun, and heavy mortar) were also new to the S-4. He

attempted to manage ammunition through logistics status reports but many were inaccurate or not submitted by subordinate task forces.[20]

The light infantry's reliance on push packages compounded the ammunition issue. Due to their austere support structure light infantry units are primarily resupplied with preconfigured loads of ammunition. In contrast, the heavy force relies more on requests to generate resupply. The difference in systems caused delays as the brigade S-4 was not proactive in acting on the task force ammunition requests. This problem was resolved by the end of the operation as the brigade S-4, FASCO, and task force S-4 worked together to process ammunition requirements.

Maintenance

Integrating different maintenance organizations and concepts was the major maintenance issue for the light-heavy brigade. Two separate organizations conducted maintenance operations for the brigade. The light infantry's DS maintenance company provided maintenance for the light units, while elements of the DS maintenance company from the heavy division supported the mechanized task force. Although the light units were in charge of maintenance operations, integration of the two units did not occur. The operation confused many units and degraded maintenance operations. The brigade S-4 received the maintenance report

and provided copies to the FASCO, but the separate shop operations by the two companies prevented a coordinated effort.

This issue presented several long-term problems for the brigade, especially in getting doctrinal assistance from corps. The 1st Infantry Division provided the equivalent of a heavy brigade FSB to support the heavy task force. The larger package replicated the corps units ("plugs") that the light division and brigade require for extended operations. The lack of adequate maintenance coordination did not provide a clear picture of the maintenance situation in the brigade. This resulted in a delay in getting back-up support from units replicating division and corps support.[21]

Transportation

Transportation presented significant problems for the light-heavy brigade. Light infantry planners normally think in terms of pounds, not tons; and their major transportation problem is moving large numbers of troops, not supplies. The attachment of the heavy force resulted in new transportation challenges such as increased consumption of fuel, ammunition, and repair parts. Although the heavy task force came with an increased number of trucks, they were not sufficient to meet all requirements generated by the heavy task force.

The problem became acute during defensive missions. The requirement to move barrier material for the entire

brigade increased the commitment on all transportation assets. Much of the wire, mines, and pickets were delivered late due to the critical need for trucks for daily support of other supplies.[22] In many cases cargo trucks were on the road continuously causing driver fatigue and maintenance problems. Command and control in the brigade support area (BSA) further compounded the issue. Initially, the S-4 and FASCO did not routinely control transportation assets, but left the control to individual units.[23] As a result, the BSA was not aware of the status of its trucks. This prevented the S-4 or FASCO from quickly prioritizing loads based on the situation.

SUMMARY

The rotations to the combat training centers (CTC) provide an opportunity to observe the product of current light-heavy tactics and doctrine under realistic combat conditions. During these rotations units must perform the sustainment functions as they would in combat. Supplies must be delivered if soldiers are to arm, fuel, and fix their systems. Likewise, weapons systems problems, both real and simulated, must be corrected if units are to fight effectively against a determined OPFOR.

The command/support relationship for light-heavy forces should be the first issue addressed by staff planners. As demonstrated by experience at the JRTC and NTC it affects all facets of sustainment. If the heavy force

will be OPCON to the light force each unit must understand its responsibility to make the relationship work. The light force must assist in coordinating with the parent heavy unit for additional support. The parent heavy force, division or brigade must tailor a support package that will sustain the unit while OPCON to a light headquarters and reduce response time for extra assistance.

Likewise, when heavy forces become attached to light units, significant sustainment issues should be resolved. The light force bears great responsibility for a heavy attachment. This relationship will require additional support from division and corps regardless of the support package brought by the heavy unit. Once again, the support package must be tailored based on the mission, enemy, terrain, troops, and time involved in the operation.

Command and control of light-heavy sustainment is critical to success. The light-heavy force with the two elements' differences in mission and methods of support require an integrated, responsive CSS system. The evolution of the FSB concept for the light division should provide quality command and control that was noticeably absent from the rotations to the JRTC and the NTC. Improved command and control should result in improved support in each of the sustainment functions. However, the fact remains that the light FSB does not possess the assets to support the heavy force unless it receives external assistance.

Supplies for the light-heavy require close planning and effective management. The difference in consumption factors for fuel and ammunition must be addressed early-on by the light force planners. In addition, regular training by light and heavy forces should increase experience levels and reduce problems presented by the differing concepts for sustainment and different types and amounts of ammunition, repair parts, and fuel.

Maintaining the light-heavy force will require constant management and integration. Both of these factors should improve with the evolution of the FSB. The new structure provides command control over maintenance operations and provides better interoperability with heavy units. However, the command/support relationship and differences in equipment will constantly challenge logisticians. When the heavy force is OPCON, it must not only bring a maintenance support package, it must also be a package that will sustain the immediate needs of the heavy force and reduce the time lost when additional support must be brought in from the parent unit. When the heavy force becomes attached to the light force, the maintenance package must be extensive to compensate for the limited maintenance capability within the light division. The light force as seen in the observation is not organized to provide maintenance assistance to a heavy attachment.

The solution of light-heavy transportation problems begins with the staff establishing the task organization.

The light force has limited assets to support itself, much less a heavy force. The heavy force must bring a transportation package that can meet its needs, whether OPCON or attached. The gaining light headquarters must integrate those assets into the overall transportation plan and prioritize their use to minimize the impact on the force to conduct tactical operations.

The establishment of a light-heavy force creates a number of sustainment issues. These issues can only be resolved through regular training and practice by light and heavy units. The demanding training conducted at the CTCs presents the conditions necessary to form realistic solutions for the logistics challenges facing the light-heavy brigade or task force commander.

ENDNOTES

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[4]U.S. Army, "FM 7-30 The Infantry Brigade," Final Draft, (Fort Benning, GA: U.S. Army Infantry School, 1990), E-27.

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[14]Ibid.

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[16]Ibid., 1.

[17]Robinson, "Trip Report NTC 90-8," 2.

[18]U.S. Army, "Concept for the Light Infantry Division Support Command,"Final Draft, (Fort Lee, VA: U.S. Army Logistics Center, 1990), 6.

[19]U.S. Army, FM 63-20 Forward Support Battalion, (Washington, DC: Department of the Army, 1990), 1-3.

[20]U.S. Army, NTC Operations Group, Memo to Commander, 1st Brigade, 7th Infantry Division, "Take Home Package-NTC 90-8," (Fort Irwin, CA: 1990), II-2.

[21]Ibid.

[22]Ibid.

[23]Ibid., I-20.

CHAPTER 5

DOCTRINE, CAPABILITIES, AND REQUIREMENTS

> At the tactical level, a unit's flexibility, its ability to maneuver or mass fires extensively, and its capacity for prolonged operations and operations in depth will all heavily depend on the sustainment system. The differences in firepower, agility, and endurance which can decide battles all derive as much from the combat service support system as they do from any of the other systems that support fighting forces.[1]

INTRODUCTION

In the previous two chapters we discussed lessons learned which were based on actual combat experiences and realistic training exercises. In this chapter I will outline the current tactical doctrine for employing the light-heavy brigade and then focus on the doctrinal considerations for sustaining the brigade. Specific "light-heavy" doctrine is currently in the evolutionary stage. Many of the lessons discussed in the preceding chapters are being used as the Army develops doctrine. Two manuals that I will rely on in this chapter are being revised based on the recent light-heavy experiences, "FM 63-2-1 Division Support Command, Light Infantry Division," coordinating draft and "FM 7-30 The Infantry Brigade," final draft.

The discussion of light-heavy tactics will be broad in nature. I will cover standard missions conducted by the light infantry brigade and the roles that the heavy task force could assume within the operation. The discussion of light-heavy sustainment will cover the entire combat service support system. First, I will discuss the sustainment imperatives and the organizations that will support the light-heavy brigade. This will be followed by a discussion of the sustainment tasks and how they apply to light-heavy sustainment. I will then use the standard logistics planning factors found in FM 101-10-1/2 Staff Officers' Field Manual Organizational, Technical, and Logistical Data Planning Factors (Volume 2) and a five day scenario to determine the requirements generated by the heavy task force while augmenting the light brigade. These will be compared to available capabilities to determine what specific support the heavy task force needs when attached or OPCON to the brigade.

TACTICAL DOCTRINE

The coordinating draft of "FM 7-30 The Infantry Brigade," outlines the basic employment considerations for the light-heavy brigade. Furthermore, it discusses the advantages of such a force:

> Employing light units with heavy . . . units is a combat multiplier. Light/heavy unit operations effectively use the light unit's ability to operate in restrictive terrain . . . which maximizes their survivability while using the mobility and firepower of the heavy units.[2]

The manual goes on to describe the key principles for employing these forces together. "The light-heavy force should be mutually supporting based on the commander's concept . . . to ensure the assets of both forces are integrated and synchronized."[3]

I underlined the words integrated and synchronized to emphasize their importance. As we saw in the historical perspective and lessons learned, if light and heavy forces are not fully integrated and synchronized to meet the commander's intent the result is likely to be a piecemeal effort.

In the offense the mobility, shock effect, and firepower of heavy forces are integrated with the light forces' ability to conduct dispersed dismounted operations such as an infiltration.[4] Offensive missions and roles for the light-heavy brigade are shown in Table 1.

Table 1. Light-heavy Offensive Operations.

LIGHT BDE MISSION	HEAVY TASK FORCE ROLE
Movement to Contact.	Overwatch likely enemy avenues of approach.
	Provide attack by fire force.
	Provide supporting fire.
	Overwatch and assist in reducing obstacles.

SOURCE: Final Draft, "FM 7-30 The Infantry Brigade."

Table 1. Light-heavy Offensive Operations (continued).

LIGHT BDE MISSION	HEAVY TASK FORCE ROLE
Attack.	Provide suppressive fires.
	Isolate the objective.
	Attack by fire.
	Exploit/reinforce success.
	Assist in assault breach.
	Provide a reserve.
	Conduct a deception.

SOURCE: Final Draft, "FM 7-30, The Infantry Brigade."

In the defense the light brigade can occupy forward defensive positions, occupy strongpoints or conduct stay-behind operations. The heavy task force provides the brigade with armored weapons systems and the ability to rapidly counterattack by fire or maneuver.[5] Defensive missions and roles for the light-heavy brigade are found in Table 2.

Table 2. Light-heavy Defensive Operations.

LIGHT BDE MISSION	HEAVY TASK FORCE ROLE
Defend	Conduct counter-reconnaissance.
	Counterattack to restore integrity of the defense.

SOURCE: Final Draft, "FM 7-30 The Infantry Brigade."

Table 2. Light-heavy Defensive Operations (continued).

LIGHT BDE MISSION	HEAVY TASK FORCE ROLE
Defend	Cover obstacles with long-range, direct fire.
	Provide a covering force/security force.
	Provide a reserve/ exploitation force.

SOURCE: Final Draft, "FM 7-30 The Infantry Brigade."

SUSTAINMENT DOCTRINE

> The tenets of AirLand Battle doctrine, initiative, agility, depth, and synchronization, are basic to operational and tactical success on the battlefield and establish the framework for arranging sustainment. Sustainment must be carried out so as to facilitate the ability of the maneuver commander to attain those tenets.[6]

This paragraph from FM 100-10 Combat Service Support illustrates the critical importance of sustainment. Without the required food, fuel, ammunition, maintenance and medical support a combat unit has little chance for success in battle.

As we discussed earlier in this chapter, there is no specific doctrine established for light-heavy forces. The same is true in combat service support. Sustainment for light-heavy forces will depend on the integration and coordination conducted by the respective units to support the commander's intent. In this section we will discuss the considerations for sustaining a light-heavy force in terms of sustainment imperatives and organization.

Imperatives

Sustainment units at all levels must support the commander. Their function is to enhance the commander's chance for success and provide logistical support to the plan.[7] Sustaining combat operations requires that commanders and staffs adhere to what are termed sustainment imperatives.[8] These imperatives are: anticipation, integration, continuity, responsiveness, and improvisation.

Logisticians must anticipate the needs of the force, now and in the future. To accomplish this they must understand the commander's plan and be aware of possible branches and sequels. They must continually plan ahead and attempt to foresee unexpected changes while supporting current operations.[9]

The close relationship of tactics and logistics requires planners to integrate CSS into all tactical planning and execution. The full participation of logistics planners insures the scheme of maneuver is supportable from a CSS standpoint. During execution, integrated actions allow the staff to make accurate recommendations to the commander on current and future missions. This is especially critical to light-heavy operations due to the differences in operational and sustainment concepts.

Any interruption of sustainment will directly degrade combat power.[10] The commander and unit require continuous support to achieve depth and maintain momentum. Likewise, CSS must be responsive. This provides the commander with

added flexibility and reinforces the agility of the force. Furthermore, it allows the commander to capitalize on unexpected success and react to unforeseen problems.

The fluid nature of the battlefield may require the sustainment system to improvise to maintain support. Based on the situation logisticians may have to develop temporary organizations or change methods of procurement and distribution. In previous conflicts improvisation, such as the "Red Ball Express" in World War II, made the difference in many battles and campaigns. "Support personnel must use innovation, suspend normal procedures when necessary, take advantage of unusual sources of supply and transportation and take risks to support AirLand Battle tactics."[11]

To implement the sustainment imperatives and provide the necessary support combat units require a versatile CSS system. This system must be organized to anticipate and respond to the needs of the force. It must be able to improvise when necessary and provide integrated, continuous logistical support.

Organization

The light-heavy brigade receives sustainment from an extensive organization. Support for these forces will come from the light infantry division support command (DISCOM), the heavy DISCOM, and the corps support command (COSCOM). Planners must understand the differences in concepts and organizations between light and heavy forces to build a proper support package.[12]

The DISCOM is the source of logistics and health service support (HSS) in the division.[13] The DISCOM commander is the principal logistics operator for the division. He oversees the DISCOM and insures that it accomplishes its mission of area support to all divisional units located in the division rear or forward brigade areas. The principal sustainment organizations within the DISCOM are the three forward support battalions (FSB), which support each of the divisional brigades, and the main support battalion (MSB).

The primary unit that will support the light-heavy brigade is an FSB frcm the light DISCOM. "The mission of the FSB is to provide division level logistical support for divisional brigades and other divisional units in the brigade area."[14] Specifically, the FSB supports and coordinates brigade requirements for supplies, maintenance, transportation, and health services.

FSBs in light and heavy divisions possess a similar organization. Figures 5 and 6 outline the basic structure of the light and heavy FSBs respectively. The primary differences are size and capability. The light FSB is small to meet the division deployability requirements and designed to meet the basic CSS needs of the light infantry brigade.

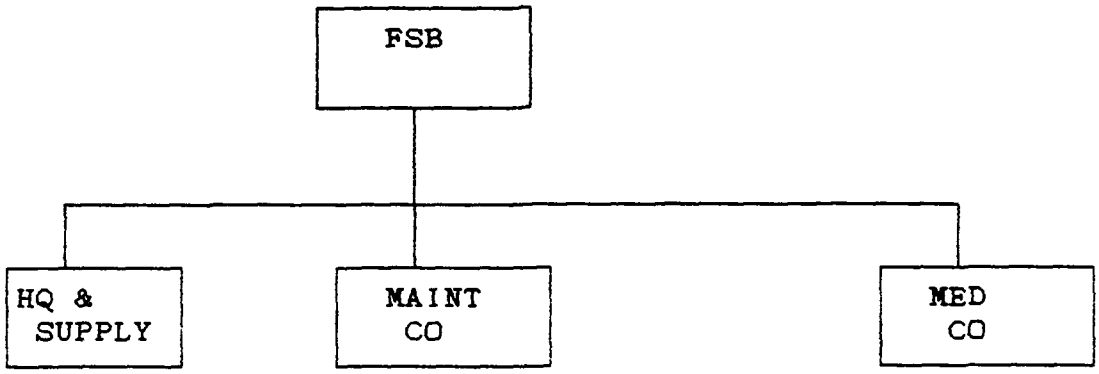

Figure 5. Forward Support Battalion, Light Infantry Division.

SOURCE: Coordinating Draft "FM 63-2-1, Division Support Command, Light Infantry Division."

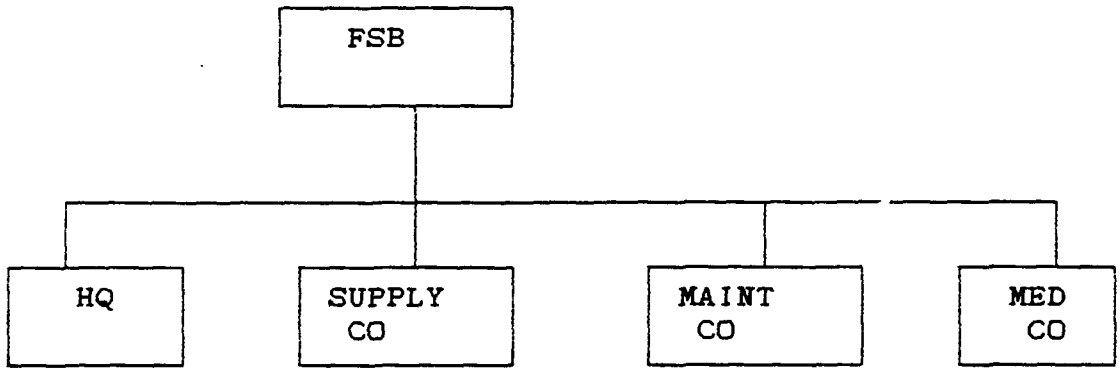

Figure 6. Forward Support Battalion, Heavy Division.

SOURCE: FM 63-20 Forward Support Battalion.

The light brigade's requirements are primarily supplies, ammunition, and transportation. Consequently, the FSB has limited capabilities. The FSB maintains sufficient assets to deliver (unit distribution) small quantities of fuel to forward battalions as well as operate an ammunition transfer point (ATP) for the brigade. Since the light infantry emphasizes replacement over repair the maintenance company has only the capability to perform minor repairs.

The FSBs in the heavy division perform the same functions, but have the capability to support the high density of vehichles and weapons systems in the heavy brigade. The heavy FSB must handle large quantities of fuel and ammunition. In addition, its maintenance company is responsible for direct support (DS) maintenance on all brigade equipment to include tanks, infantry fighting vehicles (IFV), and improved TOW vehicles (ITV). This supports the heavy force's requirement to resupply and maintain systems as far forward as possible.

The other major organization within the DISCOM is the MSB. The MSB is the principal logistics operator in the division rear. It supports units operating in the division rear and provides designated and reinforcing support to the FSBs.[18] The MSBs of light and heavy divisions perform similar functions. The battalion provides DS maintenance, supply, transportation, and medical support to divisional units.

There is a significant contrast between MSBs of light and heavy units. Figures 7 and 8 display the respective organization of the light and heavy MSBs.

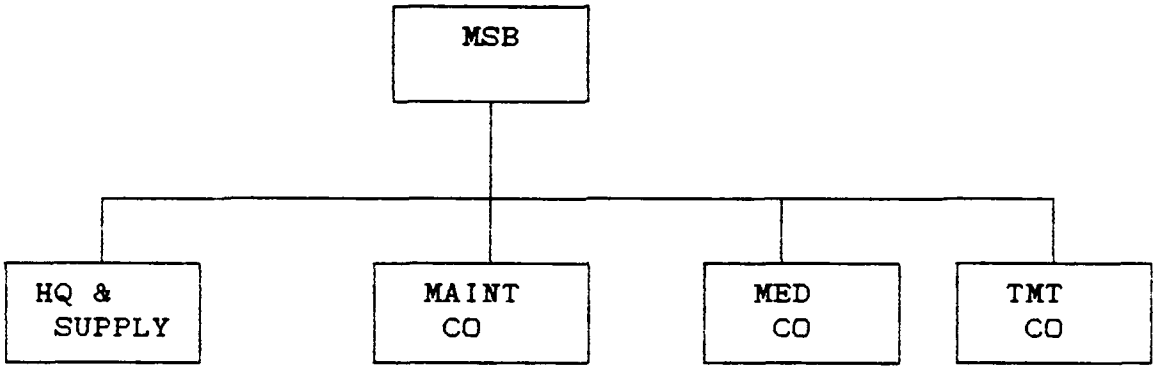

Figure 7. Main Support Battalion, Light Infantry Division.

SOURCE: Coordinating Draft "FM 63-2-1 Division Support Command, Light Infantry Division."

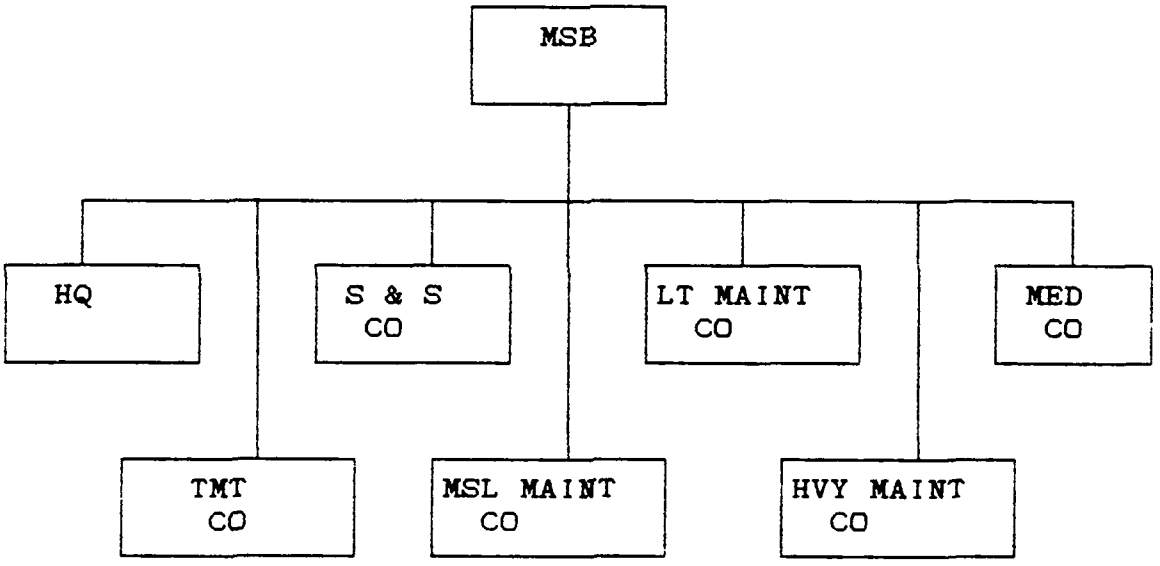

Figure 8. Main Support Battalion, Heavy Division.

SOURCE: FM 63-21 Main Support Battalion.

A major difference between light and heavy units is in unit requirements. Both MSBs provide direct support to units operating in the division rear and augment the capabilities of the FSB. However, support requirements in the light division are for 10,216 personnel compared to a heavy division of 17,354 personnel. The smaller equipment density and reduced consumption of supplies such as fuel and ammunition allows the MSB to maintain a small structure with limited capability.

The heavy MSB, by design and mission requirements, is larger and possesses greater capabilities. The large number of vehicles, personnel, and weapons systems requires the MSB to maintain a separate supply and service company, two maintenance companies, and a missile support company.[16] The MSB in combination with the division materiel management center (DMMC), aviation maintenance company, and the FSBs constitute the DISCOM sustainment capability.

The corps level organization which provides general support for supplies and back-up maintenance support to the DISCOM is the corps support command (COSCOM). An understanding of the COSCOM's organization and its capabilities to provide support is fundamental to sustaining the light-heavy brigade. This need is generated by the light infantry division's dependency on corps and echelons above corps for support. The austere support structure in the light division requires corps to provide resupply, refuel, maintenance, transportation, and airdrop support.[17]

This does not include the additional support that would be required when the light infantry receives augmentation from a heavy force.

The COSCOM is not a fixed organization and contains a mix of subordinate units as required by the size and configuration of the corps and the type units supported.[18] The COSCOM provides support to corps units and, when directed, to other services or countries. This support is for all classes of supply except secure communications and classified maps.[19]

Support for the light division and ultimately the light-heavy brigade will likely come from specific units organized into corps support groups. A support group is a tailored organization that provides supply, maintenance, and field services to units located in or passing through the corps area.[20] Moreover, these organizations augment DISCOM supply organizations and provide back-up direct support maintenance to forward divisions. Units which are likely to support the light-heavy brigade or may be referred to as corps "plugs" can be seen in Table 3.

Table 3. Nondivisional Support.

FUNCTION	UNIT THAT COULD SUPPORT
Materiel Management.	COSCOM MMC.
Airdrop.	Airdrop Supply Company.

SOURCE: Coordinating Draft "FM 63-2-1 Division Support Command, Light Infantry Division."

Table 3. Nondivisional Support (continued).

FUNCTION	UNIT THAT COULD SUPPORT
Storage and Distribution of fuel (Bulk)	Petroleum Supply Company, Medium Truck Company (Petroleum).
DS receipt, combat configuration, storage and issue of conventional ammunition.	Ordnance Company (DS). Ordnance Company (GS).
Conventional equipment maintenance.	Nondivisional Maintenance Company (DS).
Missile maintenance.	Missile Maintenance Company.
Transportation movement.	Light-Medium Truck Company, Medium Truck Company, or Heavy Truck Company.

SOURCE: Coordinating Draft, "FM 63-2-1 The Division Support Command, Light Infantry Division."

SUSTAINMENT FUNCTIONS

Once we understand the organizations that will support the light-heavy brigade we must know how the brigade will receive sustainment. The organizations from the DISCOM and COSCOM all work together to support forward forces. They each have a responsibility to assist in completing the sustainment functions of man, arm, fuel, fix, protect, and transport. In this section we will discuss the functions most critical to sustaining the light-heavy brigade which are arm, fuel, fix, and transport.

Arm

Under the maneuver oriented ammunition distribution system (MOADS) the method of distributing ammunition is the same for light and heavy divisions. There is an ATP in each brigade support area (BSA) operated by the FSB. The goal is 100 percent of the ammunition should be throughput to the BSA ATP for units operating for the light-heavy brigade.[21]

The major difference that must be considered is the weapons systems in each force and the resultant consumption factors.[22] Planners at battalion through division must be aware of the significant increase in ammunition consumption by the heavy force. This will also impact on transportation needed to move the greater quantities and weights of ammunition used by the heavy task force.

Another difference between the forces is the method of distribution. Light divisions typically rely on preconfigured unit loads, that is, the ammunition resupply is prepackaged for delivery to a specific type of unit. Resupply in the heavy division is generally done by type ammunition without any specific configuration.

The execution of ammunition management and resupply must be a coordinated effort. All players in the process, including the heavy task force S-4 transmit requirements through the brigade S-4 to the DMMC. The division ammunition officer (DAO) must plan in advance for class V supplies for the different weapons systems within the light-heavy brigade.[23] The key to arming the brigade will be

coordination to ensure the COSCOM is throughputting the correct types and quantities to the ATP.[24] This brings up another key link in the system, the ATP.

The FSB ATP must be able to handle the ammunition for the brigade. Regardless of the period of cross-attachment the ATP will require additional assets to support the increased tonnage. If the expected consumption should be high, it is likely the heavy task force will need to bring transportation assets and rough terrain fork lifts (RTFL) to support the FSB ATP operation. If the ATP lacks lift capability to support the light-heavy unit, then planners must prioritize which units will be supported by the ATP. The remainder must go to the ASP.

Fuel

In all divisions, corps units push bulk fuel to division class III points on the basis of fuel forecasts and status reports.[25] Each division operates class III points in the DSA and the BSA. The DMMC is then responsible for managing the fuel supply.

Once again, the different quantities of equipment especially those in the heavy task force, will have a significant impact on fueling the force. Planners must know the tremendous differences in consumption factors between light and heavy units. As a result there are major contrasts among divisions in assets available for storage and distribution of bulk fuels.[26] For example, the light

FSB maintains three 1,800 gallon tank and pump units while the heavy FSB has ten 5,000 gallon tankers.

Another difference between units is the variation in distribution techniques. The heavy task force utilizes supply point distribution and sends its support platoon fuel trucks to resupply from the 5,000 gallon tankers in the BSA. In contrast, the light infantry battalions do not have organic fuel trucks. This requires the light FSB to deliver fuel to its forward units.[27]

Ultimately the key factors in fueling the light-heavy brigade are consumption and distribution. The light FSB must be aware of the heavy task force requirements and these requirements must be known to the class III officer in the DMMC. To solve the distribution problem the heavy task force must bring additional fuel support in terms of 5,000 gallon tankers to augment the capability of the light FSB and MSB.

Fix

All DISCOMs are responsible for performing DS maintenance, reinforcing unit maintenance, and class IX supply operations for their supported units.[28] The maintenance concept for the light division, however, is unique. Only limited DS maintenance is completed in the BSA. The bulk of the maintenance is conducted by the MSB in the division support area (DSA). As discussed earlier in

this chapter, the light MSB has limited capabilities; one maintenance company compared to three in the heavy MSB. To compensate for the austerity in its maintenance capability the light division relies on increased support from corps and the use of replacement over repair.[29]

Maintaining the light-heavy brigade is a challenge in all areas including class IX repair parts, maintenance, and recovery. The light FSB's forward maintenance company operates a class IX point in the BSA, but the key is to have the right items in sufficient quantities to support the heavy task force.[30] Since the light division does not have any heavy equipment (except the armored combat earthmover, ACE), a system must be established to provide continuous class IX support to the task force. This will likely require a portion of the authorized stockage list (ASL) to accompany the heavy task force, depending on the duration of cross-attachment. However, ASLs are not designed to be broken out to individual task forces. Therefore, support planners must be innovative in developing a solution that best supports the task force while minimizing the impact on the heavy FSB. For example, the maintenance support teams (MST) could bring additional repair parts for equipment that is unique to the heavy task force.

Equipment maintenance provides another hurdle for light-heavy logisticians. The light maintenance units do not have the requisite mechanics, tools, or test equipment to assist in the repair of many systems in the heavy task

force. In addition to the organic maintenance platoon, the task force will need to bring a significant maintenance section for support. This should include an MST, maintenance assets from the heavy FSB to back-up the organizational mechanics, repair parts from the ASL, and a missile maintenance support team.

Recovery and evacuation of inoperable vehicles will become a problem depending on the duration and nature of the missions performed by the heavy task force. Although the task force has seven medium recovery vehicles (M-88), the light DISCOM has no tracked recovery support capability to back-up the heavy maintenance section. Furthermore, evacuation of heavily damaged equipment compounds the issue as the light division has no heavy equipment transporters (HET). The heavy task force will require significant augmentation to evacuate equipment, especially tanks and IFVs, to higher echelon maintenance.

Transportation

Movement is inherent in all CSS activities. It is integral to the arm, fuel, and fix functions.[31] The light division possesses limited ground transportation. The organic trucks are sufficient to move general supplies and division equipment. The division, therefore, relies heavily on airdrop resupply.[32] It also requires significant assistance from corps for such things as throughput of ammunition and fuel to BSAs and the preparation of

preconfigured loads. Consequently, the light-heavy brigade will require additional assets to move ammunition, fuel, and inoperable vehicles.

Understanding the differences in sustainment doctrine and concepts is only one step toward a solution to sustaining the light-heavy brigade. We need to identify, specifically, how support will be provided. More importantly, we must determine the requirements and capabilities of the light-heavy brigade.

CAPABILITIES AND REQUIREMENTS

CSS planners are responsible to, ". . . advise the commander and tactical planners on the status, capabilities, and limitations of the sustainment system supporting the force and assist in the development of courses of action."[33] To accomplish this task, they must understand the size of the force, its capabilities, and the requirements generated by the operation. As stated in the coordinating draft of FM 63-2-1, "the light infantry division does not have the required logistics redundancy to sustain the division much less forces augmenting the division. Therefore, the division requires additional assets to support augmenting units."[34]

In the previous section we identified, in general terms, the types of external support the division needs to support the light-heavy brigade. In the following section we will use planning data from FM 101-10-1/2 to identify the

quantities of support required by the heavy task force and then determine who will provide this support.

For the purpose of this analysis, we will use a five day scenario. The first two days the light-heavy brigade will attack. Subsequently, the brigade will have a day of defensive preparation and then defend for two days.

Requirements

Requirements for a supported force are computed using logistcal data from FM 101-10-1/2 and Student Text (ST) 101-6, G-4 Battle Book. To identify significant needs for ammunition, fuel, maintenance, and transportation we must break down the requirements based on dry cargo, bulk fuel, and maintenance. Table 4 contains the basic consumption factors.

Table 4. Consumption Rates.

CLASS OF SUPPLY	CONSUMPTION FACTOR
I	4.41 lbs/man/day*
III (pkg)	.59 lbs/man/day
III (bulk)	Table 2-15, FM 101-10-1/2
V	Table 2-6, FM 101-10-1/2
IX	2.50 lbs/man/day

*Based on 3 MRE's/man/day.

SOURCE: ST 101-6, G-4 Battle Book.

We begin the process of determining requirements by identifying the composition of the heavy task force. We will use a task organized mechanized infantry task force with its habitual attachments. These units will remain under the control of the task force for the duration of the operation. The task force units and total strength are shown below.

HQ Co (HHC)
Mech Infantry Co (2)
Tank Co (2)
Antitank Co
Engineer Co
Air Defense Platoon
 Vulcans (3)
 Stinger Team (6)
Fire Support Team (4)

Total Personnel: 911

Once we know the personnel strength we can use the data tables in ST 101-6 to determine estimated casualty rates and subsequent stength for each day of the operation. Table 5 reflects the daily personnnel losses by type mission.

Table 5. Daily Loss Rates for a Heavy Task Force (by percentage).

TYPE OF OPERATION	1ST DAY	SUC DAYS
OFFENSE	6.6	3.5
DEFENSE	3.5	1.9

SOURCE: ST 101-6.

ST 101-6 allows us to further estimate casualties by type. According to the manual 18% of total casualties estimates will be killed in action, 72% will be wounded, and

10% will be missing. Furthermore of the total wounded we can estimate that 10% will be returned to duty after treatment by unit medics while 1% will die of wounds. The remaining wounded receive treatment at the battalion aid station (BAS) with 26% of these personnel being returned to duty. Those not being returned from the BAS will require evacuation to a DISCOM medical facility or to a corps hospital. Based on computations for the task force, Table 6 reflects projected personnel strength by day for the operation.

Table 6. Projected Task Force Personnel Strength.

DAY	START STRENGTH	END STRENGTH
1	911	866
2	866	843
3	843	840
4	840	814
5	814	806

Now that we have the personnel strength projected we must determine equipment strength and projected attrition. These figures are critical in determining requirements for ammunition, fuel, and maintenance. Equipment density for the task force, to include support vehicles is listed on the following page.

M-1 Tank	28
IFV	28
ITV/Vulcan	12/3
Support Vehicles	33

NOTE: Support vehicles only consist of the fuel and cargo vehicles in the task force support platoon.

ST 101-6 allows us to determine attrition rates by applying loss factors to equipment density. We can identify losses by system, by type of operation. Additionally, we can project the quantity of losses that will be repairable and nonrepairable by type of operation including a projection for out of contact losses. Table 7 illustrates loss rate factors, while Table 8 reflects the percentage of repairable and nonrepairable equipment.

Table 7. Equipment Loss Rates (by percentage).

	OFFENSE		DEFENSE		OUT OF
ITEM	1ST DAY	SUC DAY	1ST DAY	SUC DAY	CONTACT
M1 Tank	25	25	20	25	5
IFV/ITV	25	20	20	15	5
SPT VEH.	15	15	15	15	5

Table 8. Repairable/Nonrepairable Rates (by percentage).

CATEGORY	OFFENSE	DEFENSE	OUT OF CONTACT
Nonrepairable	20	15	10
Repairable	80	85	90

SOURCE: ST 101-6.

Identifying repairable loss rates is critcal to estimating maintenance and recovery requirements. Systems which are repairable will be fixed by a specific echelon of maintenance. Systems that are not repairable on-site will require recovery or evacuation to the next maintenance level. As we can see from Table 9 approximately 40% to 60% of repairable losses will be fixed by unit or DS level mechanics. Consequently, to maintain combat power forward, the task force will need a large maintenance element from the maintenance company of its parent brigade's supporting FSB. Likewise, the table reflects the percentage of systems that will require evacuation to back-up DS or to theater army maintenance facilities. This means the task force will need additional tracked recovery vehicles and HETs to reduce evacuation time.

Table 9. Repair Estimations of Repairable Losses (by percentage).

CATEGORY	OFFENSE	DEFENSE	OUT OF CONTACT
On-site	20	20	30
DS	20	25	30
Back-up DS	30	30	20
Theater Army	30	35	20

SOURCE: ST 101-6.

By applying the loss rates from the respective maintenance tables we can determine estimated equipment availability for the entire operation. Table 10 illustrates

equipment density for the task force while supporting the light infantry brigade. Based upon this information and the personnel data previously computed we can estimate total supply requirements for the task force. This is accomplished by applying the respective strengths to the consumption factors listed in Table 4 and the tables listed in FM 101-10-1/2. Table 11 shows the task force daily requirements for selected supply classes.

Table 10. Equipment Strength (end of day).

DAY	M1 TANK	IFV	ITV	SPT VEH
Start	28	28	12	33
1	22	22	10	31
2	18	19	9	29
3	18	19	9	28
4	15	16	8	26
5	14	15	7	24

Table 11. Task Force Supply Requirements.

CLASS	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
I*	2.0	1.89	1.84	1.82	1.77
III (p)*	.27	.25	.25	.24	.23
V*	78	68	68	88	75
IX*	1.13	1.07	1.04	1.03	1.01
III (b)	37,808 GL	32,492 GL	29,090 GL	29,000 GL	26,273 GL

*Dry cargo requirements are expressed in short tons (ST).

Capabilities

In the next phase of our analysis we must determine the task force's capability to meet the requirements. First we will examine the capability to support the ammunition requirement since it accounts for most of the dry cargo needs of the task force. To identify the ammunition capability we must determine the capacity of the combat systems and the task force support platoon. Table 12 shows the on-board vehicle capacity.

Table 12. Ammunition Capacity for Combat Vehicles.

VEHICLE	CAPACITY	# OF SYSTEMS	TOTAL CAPACITY
M1 Tank	2.7 ST	28	946 ST
IFV	1.4 ST	28	306 ST
ITV	.6 ST	12	26 ST
TOTAL :			1278 ST

The vehicles designated to move ammunition come from the respective infantry and armor battalion support platoons. The mechanized infantry task force support platoon has the 5-ton cargo truck while the two armor companies will bring the 11-ton Heavy Expanded Mobility Tactical Truck or HEMTT from their parent support platoon.[35] The available ammunition vehicles are identified below.

Table 13. Task Force Ammunition Vehicles.

5-TON CARGO TRUCK	11-TON CARGO TRUCK
20	4

By combining the cargo truck capacity with the combat vehicle capability we can determine the basic haul capability of the task force and compare it to the requirements identified in Table 11. Table 14 reflects the comparison of capabilities and requirements. The decreasing capabilities over the course of the operation reflect the attrition to both combat systems and support vehicles. The table points out that the task force possesses sufficient capability to carry the ammunition as well as the remaining dry cargo requirements.

Table 14. Dry Cargo Capability versus Requirement.

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
CAP	132 ST	127 ST	114 ST	109 ST	96 ST
REQ	82 ST	72 ST	72 ST	92 ST	79 ST

Now I will shift to identifying the task force's ability to support the bulk fuel requirement. The method we will follow is similar to that used with ammunition. First we will identify combat vehicle fuel capacities followed by the capacities of the task force support platoon's fuel transporters.

According to Jane's Armor and Artillery 1990-1991, the fuel capacity of the M1 tank is 504 gallons; the capacity of the infantry fighting vehicle is 175 gallons; and the fuel tank of the improved TOW vehicle holds 95 gallons.[36] Additionally, the task force has forty-four

combat support systems which account for a capacity of 4,355 gallons. These vehicles include the mortar carriers, tracked ambulances, command post vehicles and attached armored personnel carriers.

Combat battalions also maintain refuel vehicles in their support platoons. The mechanized infantry battalion is equipped with the 1,200 gallon tank and pump unit (TPU) mounted on a 5 ton cargo truck and a 600 gallon fuel pod mounted on a 1 1/2 ton trailer. The two armor companies will bring the 2,500 gallon HEMTT fuel truck, which is organic to the armor battalion support platoon.

Based on the combination of tank and mechanized infantry companies, the task force will have both types of refuel vehicles. The engineer company will also have organic refuel capability to support its systems. Table 15 depicts the number and type of each vehicle, while table 16 reflects fuel capabilities and requirements.

Table 15. Task Force Refuel Capability.

	TPU	HEMTT TANKER
Support Platoon	5	
Tank Co (2)		4[a]
Engineer Co.	2[b]	

[a]Although these vehicles accompany the tank companies they normally work for the task force support platoon.

[b]These vehicles draw their fuel with the support platoon but specifically support engineer systems such as bulldozers.

Table 16. Task Force Fuel Capabilities and Requirements (Gallons).

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
CBT VEH	26,122	21,313	18,487	17,987	15,165
SPT PLT FUEL CAP	20,800	19,000	19,000	16,500	14,700
REQ	37,808	32,492	29,090	29,000	26,273
REMAINING CAP	9,114	7,821	8,397	5,487	3,592

In analyzing the capabilities and requirements we can see from the table that the task force appears to have sufficient fuel capability. However, we must insure that this information is used realistically. During the five day operation it is not realistic to assume that vehicles in the task force will refuel at the start of each day. In many cases vehicles will refuel between tactical missions or based on the intensity of combat they may refuel when there is an opportunity. Also, if the task force has a long mission (in time and distance), some vehicles and units may refuel more than once during a given day. Consequently, the information in table 16 becomes a management tool for the brigade and task force S-4s to estimate the overall needs of the task force. These figures provide basic information which will be revised prior to each mission when the task force S-4 submits his fuel forecast.

To insure there is sufficient fuel capability for the task force and reduce the refuel time for the support platoon the task force will require external fuel support.

To sustain the fuel needs over the course of the operation, the task force should receive five 5,000 gallon tankers. The light infantry division has only 14 TPUs and does not have any 5,000 gallon tankers.[37] The parent DISCOM or the COSCOM must provide the additional fuel hauling capability.

The COSCOM unit which could provide fuel support to the light FSB is the Transportation Medium Truck Company (POL) which has 60 5,000 gallon tankers.[38] This support would depend on other activities in the corps because this company is responsible for movement and issue of fuel from the Petroleum Supply Company (GS) which throughputs fuel to the forward divisions.

The other option is the heavy DISCOM. The parent brigade FSB has ten 5,000 gallon tankers. Since the task force makes up approximately one third of the heavy brigade's maneuver force it could receive approximately three tankers. The remaining two tankers could come from the Supply and Service Company in the MSB which maintains 34 5,000 gallon tankers.[39]

The remaining capability to identify is maintenance and recovery. Based on the loss figures in Table 10 the task force will need additional mechanics, repair parts, and recovery vehicles. Since the light division depends on corps for much of its maintenance support and does not have any recovery vehicles or HETs, the options are the same; COSCOM or DISCOM.

The COSCOM unit most likely to provide assistance is the Ordnance Maintenance Company Nondivisional (DS). This company will usually be designated to establish back-up support for the light DISCOM.[40] The company could provide support for small arms and automotive, however its capability is limited by the number and types of systems support teams assigned. These teams are assigned according to the type of units supported by the company. Corps could also assist in delivery of repair parts, with coordination from the light DISCOM or G-4. The company that would establish repair parts support is the Repair Parts Supply Company (GS). Once again, this would be limited because this company is the primary corps unit for the storage and issue of repair parts.

The corps unit which could provide immediate support is the Transportation Heavy Truck Company. This company has 24 HETs with the principal mission of moving tanks and outsized cargo.[41] The HETs could evacuate inoperable task force vehicles which require back-up DS or theater level maintenance.

The remaining support would then come from the parent FSB and MSB. The FSB maintenance company would provide an ASL designed to support the task force for the five day operation. The ASL could be maintained by the maintenance support teams (MSTs) that accompany the task force maintenance section. Furthermore, if the use of corps HETs

was not practical, the heavy MSB could establish the necessary support form its Transportation Motor Transport Company. The company is authorized 24 HETs to move outsized cargo.

Based on the previous discussion of capabilities and requirements we can see that the heavy task force has a sound sustainment base but requires significant assistance when augmenting a light infantry division. Planners that establish a light-heavy brigade must also understand the issues and possible solutions to insure the brigade receives adequate support.

Although we focused on the command/support relationship of attached, the heavy task force requires similar support if it is OPCON to the light brigade. The major difference between the two relationships, which we discussed in chapter 1, is that the heavy brigade retains responsibility for logistical support if the heavy task force is OPCON. In the case of light-heavy operations the support package for OPCON is not much smaller and must address the same functions as the package supporting an attached force. Table 17 reflects a consolidated list of support assets required to sustain the task force while augmenting the light infantry brigade. These assets would be attached to the light FSB if the task force were attached to the brigade.

Table 17. Heavy Task Force Support Package.

FUNCTION	UNIT THAT COULD SUPPORT
Ammunition	
Trailer, 22 1/2 ton (2)	Med Trk Co - COSCOM
Forklift, 6,000 lb	Supply Co - Hvy FSB Ordnance Co, Ammunition DS - COSCOM
Fuel	
Tanker, 5,000 gl (5)	Supply Co - Hvy FSB (3) Supply and Service Co Hvy MSB (2)* Trans Med Trk Co (POL) COSCOM (5)
Maintenance	
Mech/Armor MSTs	Maint Co - Hvy FSB Hvy Maint Co - Hvy MSB Ord Co - COSCOM
Missile Systems MST	Ordnance Missile Support Co - Hvy MSB Ordnance Missile Support Co - COSCOM
ASL support	Maint Co - Hvy FSB Lt Maint Co - Hvy MSB
Transportation	
Semitrailer, HET (3)	TMT Co - Hvy MSB Trans Hvy Trk Co COSCOM

*To minimize the impact on the heavy FSB, which only has ten 5,000 tankers, the support would come from the FSB and MSB as shown.

SUMMARY

As we address operations and sustainment we need to understand that light-heavy integration requires detailed work by commanders and staffs. First, the commander must use forethought when he decides to task organize a light-heavy force. A light-heavy brigade can be an effective force but requires extensive thought in terms of tactical mission, command/support relationship, and sustainment.

Secondly, the respective staffs must know the sustainment requirements that the brigade generates. The division staff must realize what sustainment assets the heavy task force needs and insure that division and corps level support is present. Subsequently, the brigade and task force staff must understand the differences between light and heavy support concepts. They must be proactive in asking the question, what is required to sustain the force? This should be asked for each of the sustainment tasks especially, arm, fuel, fix, and transport.

Finally, until more doctrine is written for light-heavy operations, planners must, as FM 100-10 states, " be innovative." When the solution is not in a book or manual planners must guide on the sustainment imperatives. Light-heavy sustainment, perhaps more than with other forces, requires planners and operators to anticipate and integrate sustainment actions. They must insure that support for the

light-heavy brigade is continuous and responsive and they must be ready to improvise when necessary to solve sustainment problems.

ENDNOTES

[1]U.S. Army, FM 100-5 Operations, (Washington, DC: Department of the Army, 1986), 59.

[2]U.S. Army, "FM 7-30, The Infantry Brigade," Coordinating Draft, (Fort Benning, GA: U.S. Army Infantry School, 1990), E-1.

[3]Ibid.

[4]FM 7-30, "The Infantry Brigade," (1990), E-39.

[5]Ibid., E-32.

[6]U.S. Army, FM 100-10, Combat Service Support, (Washington, DC: Department of the Army, 1988), 1-2.

[7]Ibid., 1-9.

[8]Ibid.

[9]U.S. Army, FM 63-2-1, "The Division Support Command, Light Infantry Division," Coordinating Draft, (Fort Lee VA: U.S. Army Combined Arms Support Command, 1990), 1-4.

[10]Ibid.

[11]Ibid., 1-5.

[12]U.S. Army, Strike Operations: Handbook for Commanders, (Fort Leavenworth KS: U.S. Army Command and General Staff College, 1990), 2-69.

[13]FM 63-2-1, "The Division Support Command, Light Infantry Division," (1990), 1-10.

[14]U.S. Army, Table of Organization and Equipment, 63-215-L100, Forward Support Battalion, Light Infantry Division, (Washington, DC: Department of the Army, 1990), I-1.

[15]U.S. Army, FM 63-21 Main Support Battalion, (Washington, DC: Department of the Army, 1990), 1-5.

[16]Ibid.

[17]FM 63-2-1, "Division Support Command, Light Infantry Division," (1990) 1-11.

[18]U.S. Army FM 100-15 Corps Operations, (Washington, DC: Department of the Army, 1989), 2-6.

[19]U.S. Army, FM 63-3J Combat Service Support Operations-Corps, (Washington, DC: Department of the Army, 1985), 2-2

[20]FM 63-3J, (1985), 2-3.

[21]Strike Operations, (1990), 2-72.

[22]Ibid.

[23]Ibid., 2-73.

[24]Ibid.

[25]FM 63-2-1, (1990), A-4.

[26]Ibid., A-5.

[27]Ibid.

[28]Ibid.

[29]Strike Operations, (1990), 2-74.

[30]FM 63-2-1, (1990), A-6.

[31]Ibid., A-7.

[32]Strike Operations, (1990), 2-75.

[33]FM 100-5, (1986), 70.

[34]FM 63-2-1, (1990), 1-3.

[35]U.S. Army, FM 71-2 The Tank and Mechanized Infantry Battalion Task Force, (Washington, DC: Department of the Army, 1988), 7-19.

[36]Christopher F. Foss, ed., Jane's Armor and Artilley, 11th ed., (Surrey: Jane's Information Group, 1990-91), 471.

[37]U.S. Army, Table of Organization and Equipment, 63-221-L100, DISCOM, Light Infantry Division, (Washington DC: Department of the Army, 1990), I-3.

[38]U.S. Army, ST 101-6, G-4 Battle Book, (Fort Leavenworth, KS: U.S. Army Command and General Staff Collge, 1990), 4-23.

[39]Ibid., 5-8.

[40]Ibid., 4-21.

[41]Ibid., 4-26.

CHAPTER 6

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

> The future tactical battle will present a definite challenege to our leaders. It will be fought by a mix of forces, and our leaders will have to be experts at handling all variations of the mix. Since the mixing can occur at any level . . . the leaders from squad and section . . . to the highest tactical echelons will be called on to make decisions that demand a knowledge of both heavy and light forces.[1]

SUMMARY

As pointed out by General John Galvin in the above quote, the Army of the future requires that we be able to employ light and heavy forces tactically and logistically. Future force reductions, a predominantly CONUS-based force, and a changing threat necessitate the Army's ability to employ all types of forces to achieve success. This was evident from the land campaign in Operation DESERT STORM where the Army employed three armored divisions, two mechanized infantry divisions, an airborne division, and an air assault division.

The purpose of this study, which grew from some of the previous thoughts, was to determine what logistical support is necessary to sustain a light-heavy brigade. The determination could not soley rest on a singular opinion or

simply the statement that such a force requires food, fuel, ammunition, maintenance and transportation. It was necessary to identify the viability of this force and then to determine, based upon our current force structure and doctrine, how to sustain the force during tactical operations.

In the first chapter I discussed the basic information on light and heavy forces to form the foundation for this study. I then reviewed the extent of literature on the employment and sustainment of these forces throughout recent history. The review of literature identified that there were initially gaps which existed in the study, application, and support of a light-heavy force. The information in chapter 2 did, however, indicate that the Army is taking steps to resolve this void with doctrinal manuals currently under revision such as Field Manual (FM) 7-30 The Infantry Brigade and FM 63-2-1 Division Support Command, Light Infantry Division.

Equipped with this information I began to determine the logistical support required for a light-heavy brigade by examining past combat experience, recent rotations to the combat training centers (CTC), and by reviewing current doctrine. The historical perspective indicated that light-heavy forces are effective in all levels of conflict. The experience from history revealed that different tactical and logistical concepts caused problems for both the light and heavy commanders. These differences, especially in the

sustainment area, were solved through extensive coordination and the use of improvisation. Determination on the part of the light and heavy force leaders and staffs developed ways to support this force. The work accomplished in the past reiterated the fact that regardless of position, assignment, or task, tactics is logistics and logistics is tactics. Today it may simply be said that tactical operations and sustainment are inseparable.

As I reviewed the information from the recent CTC rotations and the current doctrine I found that old problems still existed. Issues such as task organization, coordination, and sustainment concepts continued to hinder light-heavy operations. Also that the old problems continue today due to the changes in force structure, organization, and equipment. The advanced technological systems such as the M-1 tank and M-2 infantry fighting vehicle generate greater requirements for heavy forces than previous systems. Such sustainment needs cannot be met by the CSS structure of the light brigade or division without significant external assistance. Experience from the CTCs and major exercises such as REFORGER, however, are providing the feedback necessary to resolve many of these issues.

CONCLUSIONS

Sustaining the light-heavy brigade requires extensive forethought by the commander establishing the force, detailed staff planning at all levels, and a thorough

understanding of light and heavy sustainment concepts. A full appreciation of this statement and the answer to the primary research question can be gained by reviewing the study's subordinate questions and supporting conclusions.

1. Why would the Army employ a light-heavy force? The Army is a strategic force within the United States' National Security Strategy. As a result it must be ready to fight in all levels of conflict against any possible threat. To accomplish this task the Army must maintain forces which are rapidly deployable; and when deployed are strong enough to defeat the threat. Light and heavy forces have complementing capabilities which, when task organized, maximizes the combat potential of both forces. Examples of the success of these forces are evident in each of the conflicts reviewed in chapter 3.

2. What are the sustainment requirements of the heavy task force while augmenting the light infantry brigade? Specifically, what are the requirements generated for ammunition, fuel, maintenance, and transportation for a five day operation? The logistical requirements for a unit must be computed before an operation starts. This is necessary in order to determine if the force possesses sufficient capability to satisfy the requirement. This is critical when mixing light and heavy forces due to the different support concepts and significantly different consumption rates. In chapter 5, I determined that the light-heavy brigade had significant logistical requirements,

but was capable of meeting them if given sufficient external support. Consequently, the task force would need additional support to sustain these requirements over a five day operation. This leads to the next question in the study.

3. What combat service support units must be available to support the heavy task force while augmenting the light infantry brigade? In chapter 5, I identified that whether the task force was attached or OPCON, it would require additional support units for ammunition, fuel, maintenance and recovery, and transportation. Analysis revealed that units capable of supporting the increased needs of the light-heavy brigade were available at the parent DISCOM of the heavy task force and from the COSCOM. Further study reflected that a mix of support from the DISCOM and COSCOM would reduce the impact on the heavy division's sustainment capability.

4. How should the units sustaining the light-heavy brigade be organized? I developed two answers to this question based on a comparison of the command/support relationships of attached and operational control (OPCON). If the heavy task force is attached to the light brigade, the additional support units should be attached to the light FSB. This will establish an integrated support system for the brigade and insure that the major support assets are under the control of the brigade's logistics operator, the FSB commander. Moreover, since the light brigade commander

is responsible for the sustainment of the heavy task force his FSB can centrally control and manage all support assets in the brigade.

If the task force is OPCON to the light brigade then the support assets which physically accompany the task force should be OPCON to the light FSB. This alleviates a number of issues which may occur in an OPCON relationship. If the heavy task force support assets are OPCON to the light FSB the support package will become integrated into the light brigade sustainment system. This facilitates command and control of all support assets under the brigade's logistics operator, the FSB commander. Although the heavy brigade commander retains responsibility for sustainment, the OPCON of support elements insures that the light FSB monitors sustainment of the heavy task force. If the task force needs help getting support from its parent unit, the light FSB can quickly assist in the coordination. This may reduce the time and effort consumed by the task force S-4 or executive officer needing to go back to the parent brigade to resolve logistic issues.

Other Conclusions

1. The reorganization of the light DISCOM will facilitate light-heavy sustainment, but it will not solve all problems. The primary advantage of the new structure is increased command and control. The fact that light and

heavy divisions maintain similar DISCOMs also increases light-heavy interoperability. At the brigade level the similar FSB structure will make light-heavy sustainment easier to coordinate, integrate, and support. Likewise, the FSB provides the brigade commander with a logistic operator and staff to anticipate and respond to the significant requirements of the light-heavy brigade.

2. In the case of the light-heavy brigade the command/support relationship is not necessarily a simple answer to a complex issue. As I discovered in my research, the recommended relationship is OPCON due to the light division's austere CSS system. However, when I analyzed the requirements of the heavy task force I found that it needs almost the same size support slice, with the exception of the ASL and some of the fuel tankers, as it does when attached. Because of the distances that may be involved and the need to provide continuous, responsive support, a task force OPCON to a light infantry brigade requires a large support element. This is a fact that is not addressed in current manuals or the ongoing revisions. Additionally, regardless of the command/support relationship the heavy FSB or DISCOM should provide a liasion officer (LNO) to the light FSB. This officer can assist in the planning, forecasting, and coordination required by the light FSB to support the sustainment of the heavy task force.

RECOMMENDATIONS

Based on the findings, my recommendations fall into three categories doctrine, training, and perceptions.

Doctrine. The revisions being made in current manuals to include more doctrine on light-heavy operations needs to continue. Manuals already in print such as FM 100-15 Corps Operations, FM 71-100 Division Operations and FM 100-10 Combat Service Support should be revised along the same idea. The fundamental issue for each of these manuals is to establish a detailed chapter called "Light-Heavy, Heavy-Light Operations." FM 100-15 and FM 71-100 currently have annexes which address predominantly heavy-light considerations, but only in a cursory manner. FM 100-10 does not specifically cover this force mix. Moreover, the doctrine needs to address the tough issues, such as the command/support relationships. Although the recommended relationship for a heavy task force supporting a light infantry brigade is OPCON, doctrine should cover the issues that come with an OPCON situation. Command and control of support assets, recommended support packages, and exchange of LNOs should all be covered in the respective manuals.

In the future, we are likely to see more light-heavy and heavy-light operations. The requirement for more information on how to fight and sustain these forces already exists. We need to formulate doctrine which supports the commander's ability to rapidly task organize, employ, and sustain these forces. Futhermore, increased doctrine will

facilitate the development of improved tactics, techniques, and procedures for the use and support of light-heavy units.

Training. The Army needs to increase the training conducted by the light-heavy mix. This is an issue that applies to specific areas. First, TRADOC schools must place more emphasis on light-heavy/heavy-light operations. The schools should conduct scenarios which address light-heavy/heavy-light missions insuring that sustainment problems are encountered and resolved by the students. Secondly, frequent training exercises and rotations to the CTCs should include mixed force operations. This will improve a number of light-heavy issues, especially sustainment. Regular training by light and heavy forces will increase the integration of the different support concepts and requirements. This should lead to a better understanding by the respective units of how to sustain the light-heavy force. Lastly, the training events and subsequent lessons should work toward the development of techniques and procedures which will facilitate the rapid task organization of combat and combat service support forces. This is an area where CALL can coordinate the effort to develop a single package of recommendations which can be acted on by the Combined Arms Command (CAC) and the Combined Arms Support Command (CASCOM).

Perceptions. As we continue to employ light and heavy forces together we need to work to eliminate the perception of light-heavy being separate operations. The

Army is a combined arms team which requires all assets to accomplish the mission. Previously it was not uncommon to have a light-heavy force conduct a mission but have the respective light and heavy units consider themselves on distinct operations. Based on recent training exercises light-heavy forces are operating more as a combined arms team. As stated by Major General Peter Boylan, former commander of the 10th Mountain Division (Light),

> Heavy forces and light forces are somewhat misleading terms in that they provide a sense of distinctness, of separateness, of an inability for integrated use. Hence, the idea of complimentary force operations may cause us to be more receptive to tactics/logistics that aim to destroy the enemy's total capacity to conduct battle . . . . Such an approach may be increasingly important to success in battle as we march into the 21st century.[2]

In the future, brigade operations will become more prevalent, especially as the Army moves toward AirLand Battle Future. To win on the battlefield, we must establish a system that provides continuous, responsive sustainment for the light-heavy brigade.

ENDNOTES

[1]John R. Galvin, "Heavy-Light Forces and the NATO Mission," Infantry 9 (July-August 1984): 14.

[2]Peter J. Boylan, "Complementary Force Operations," Military Review 70 (June 1990), 37.

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APPENDIX A